2. Compliance Summary

Michael J. Taffet
Richard G. Blake
Tina M. Carlsen
Dawn M. Chase
Sabre J. Coleman
Ellen Eagan
Karen J. Folks
Robert J. Harrach
Stephen P. Harris
Saverio P. Mancieri
Mathew Mlekush
Robert J. Vellinger
Jim S. Woollett, Jr.
Kenneth C. Zahn

Introduction

During 1995, Lawrence Livermore National Laboratory (LLNL) participated in numerous environmental activities to comply with federal, state, and local regulations as well as internal requirements and Department of Energy (DOE) orders. Activities related to air, water, waste, waste reduction, community "right to know," and other environmental issues were addressed at the Livermore site and Site 300. Many documents addressing these activities and other environmental issues are available for public viewing at the LLNL Visitors Center and the Livermore and Tracy Public Libraries. A summary of the permits related to environmental activities conducted in 1995 is presented in **Table 2-1**. Details of the wide range of compliance activities are discussed in the following sections.

CERCLA/ SARA, Title I

LLNL has two projects that are under the jurisdiction of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) / Superfund Amendment and Reauthorization Act (SARA), Title 1. These are the Livermore Site Ground Water Project and the Site 300 Environmental Restoration Program.

Livermore Site Ground Water Project

The Ground Water Project (GWP) complies with provisions specified in a Federal Facility Agreement (FFA) entered into by the Environmental Protection Agency (EPA), DOE, the California EPA's Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (RWQCB). As required by the agreement, the project addresses compliance issues through investigations of potential contamination source areas (such as suspected old release sites, solvent handling areas, and leaking underground tank systems), continued monitoring of ground water, and remediation. The ground water constituents of concern are volatile organic compounds (VOCs), primarily trichloroethylene (TCE) and tetrachloroethylene (PCE). These contaminants are located primarily in the interior of the site but to some extent at the site boundary and beyond, mainly to the west and south of the site. High concentration areas generally correspond to treatment facility locations (see **Figure 2-1**). However, treatment facilities A & B (TFA & TFB) are located at areas of lower concentrations downgradient from high concentration "hot spots" to aid our remediation of contaminated ground water at and beyond the site boundary.

2. Compliance Summary

Table 2-1. Summary of permits[a].

Type of permit	Livermore site	Site 300
Air	178 permits (various equipment).	41 permits (various equipment).
Water	WDR Order No. 88-075 for discharges of treated ground water from TFA to percolation pits and recharge basin.	WDR Order No. 93-100 (amended 80-184) for post closure monitoring requirements for 2 Class I landfills.
	WDR Order No. 91-091, NPDES Permit No. CA0029289 for discharges from Livermore site remediation activities and treatment units to surface waters, infiltration trenches, and injection wells.	WDR Order No. 94-131, NPDES Permit No. CA0081396 for discharges of storm water associated with industrial activity and from cooling towers.
	WDR Order No. 95-174, NPDES Permit No. CA0030023 (replaced WDR Order No. 91-13-DWQ as amended by Order No. 92-12-DWQ) NPDES General Permit No. CAS000001) for discharges of storm water associated with industrial activities and low threat non-storm water discharges to surface waters, infiltration trenches, and injection wells.	WDR Order No. 85-188 for operation of septic systems, Class II surface impoundments, and a domestic sewage lagoon.
	WDR Order No. 92-08-DWQ, NPDES General Permit No. CAS000002, Bldg. 132 Site ID No. 2 01S300881 Bldg. DWTF/MWMF Site ID No. 2 01S305140—for discharges of storm water associated with construction activities impacting 2 hectares or more.	WDR Order No. 91-052, NPDES Permit No. CA0082651 for discharges of treated ground water from the eastern General Services Area treatment unit.
Hazardous waste	ISD CA2890012584	Part B CA2890090002
	DTSC Permit No. 2-13640 for disposal of extremely hazardous waste.	Docket HWCA 92/93-031. Open Burning of Explosives Waste.
	Authorization to perform Waste Resin Mixing in Unit CE231-1 and Unit CE443-1 under Conditional Exemption tier.	
Sewer	Discharge Permit Nos. 1250 (95–96), 1508G (95–96), and 1510G (95–96) for discharges of wastewater to the sanitary sewer, discharges of sewerable ground water from TFF, and ground water discharges from restoration treatability studies (in order of numbers as indicated).	
Tanks	Fees paid for 18 underground petroleum and waste storage tanks.	Fees paid for 5 underground petroleum product tanks.
Other	FFA, ground water investigation/remediation; ACEHS medical waste permits for treatment and storage; 1 project completed under Army Corps of Engineers Nationwide Permit, 5 streambed alteration agreements.	FFA ground water investigation/remediation; 4 streambed alteration agreements; 52 registered class V injection wells.

[a] Permit numbers are based on actual permitted units maintained and renewed by LLNL during 1995.

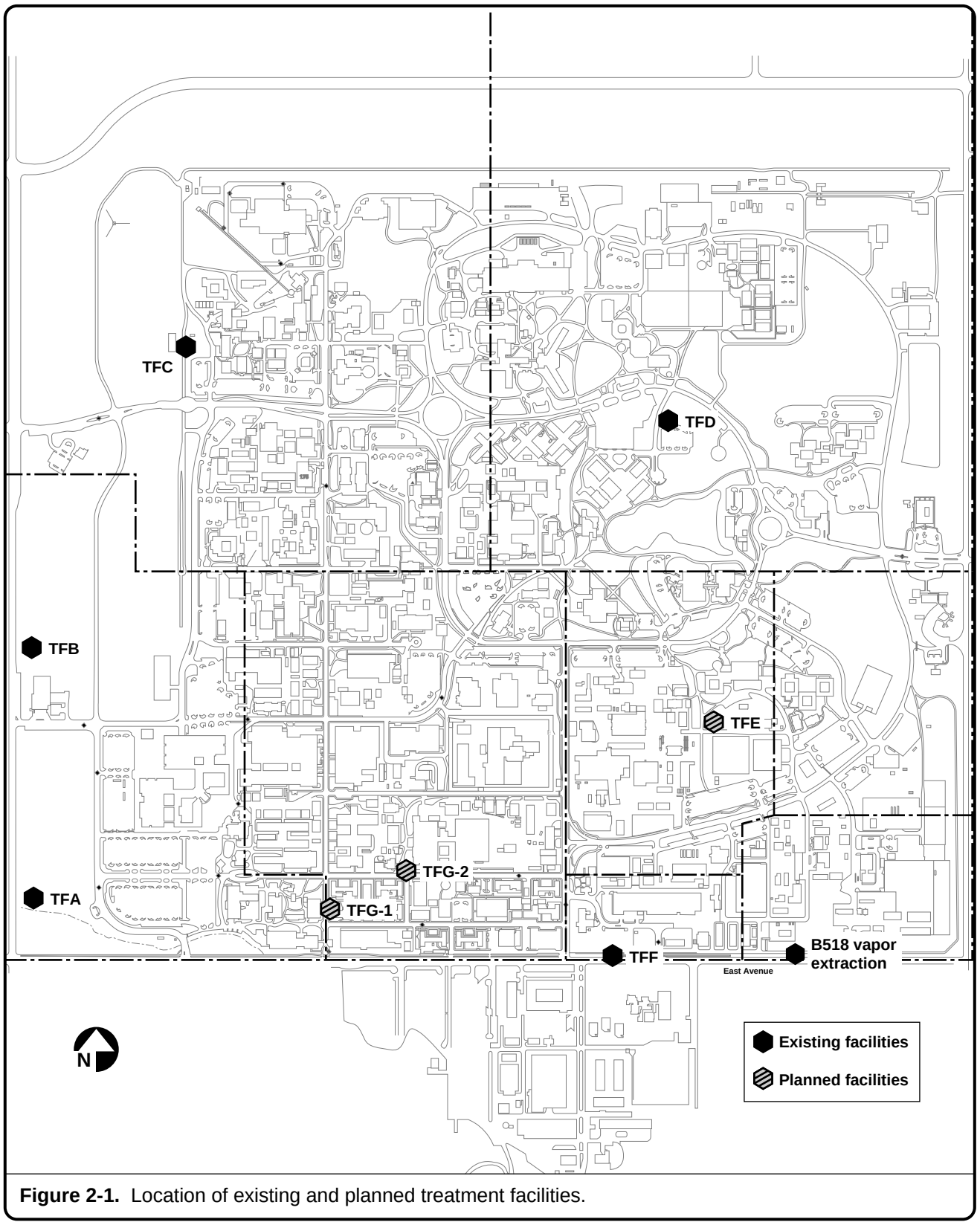

Figure 2-1. Location of existing and planned treatment facilities.

2. Compliance Summary

The primary treatment technology employed at the Livermore site to remediate contaminated ground water is ground water pump-and-treat. This technology employs a dense network of ground water extraction wells, monitoring wells, pipelines, and surface treatment facilities. Treatment facility operations and ground water extraction and cleanup activities are discussed in this section.

Required Documentation

In 1995, DOE/LLNL submitted several CERCLA documents for the Livermore site and fulfilled all of the community relation activities required under the National Contingency Plan and FFA. Recipients of these CERCLA documents included EPA, RWQCB, DTSC, Community Work Group Information Repositories, and Tri-Valley Citizens Against a Radioactive Environment (CAREs). The final version of *Remedial Design Report No. 5 for Treatment Facilities G-1 and G-2* (Berg et al. 1995) was issued on March 31, 1995, according to the revised schedule presented in the *Remedial Action Implementation Plan* (Dresen et al. 1993). The draft and draft final *Compliance Monitoring Plan* (Nichols et al. 1996) were issued on schedule on August 30 and December 29, 1995, respectively. As required by the FFA, DOE/LLNL issued the *1994 Ground Water Project Annual Report* (Hoffman et al. 1995) and the January and February 1995 *Ground Water Project Monthly Progress Report* on schedule. In March 1995, the following changes to reporting requirements were implemented by the Livermore Site Remedial Program Managers (RPMs) to reduce the scope and associated costs of document preparation:

- Discontinued monthly progress reports and held RPM meetings monthly. The RPM Meeting Summary now constitutes the monthly report and records all decisions, agreements, noncompliances, if any, and policy changes discussed at RPM meetings.
- Provided self-monitoring data quarterly as an attachment to RPM Meeting Summaries.

In 1995, DOE/LLNL submitted nine RPM Meeting Summaries; the March, June, September, and December summaries included quarterly self-monitoring data (McConachie and Brown 1995a, 1995b, 1995c, 1996).

Treatment Facilities

Treatment Facility A (TFA) has been operating since September 1989. TFA treated more than 270 million liters (ML) of ground water during 1995, removing and destroying approximately 12 kg of volatile organic compounds (VOCs).

Since TFA began operating, about 640 ML have been treated, removing 58 kg of VOCs. (See **Figure 2-1** for the locations of treatment facilities.) Treated waters from TFA are discharged into the recharge basin.

Treatment Facility B (TFB) has been operating since October 1990; TFB treated about 39 ML of ground water in 1995, removing and destroying approximately 3.4 kg of VOCs. More than 125 ML have been treated, removing 12.4 kg of VOCs since TFB began operating. TFB's treated waters are discharged into a drainage ditch at the west perimeter of the site feeding into Arroyo Las Positas.

Treatment Facility C (TFC) has been operating since October 1993. In 1995, a total of 2.7 kg of VOCs was removed from approximately 22 ML of ground water treated at TFC. Treated waters from TFC are discharged into Arroyo Las Positas.

Construction of Treatment Facility D (TFD) began on February 28, 1994, and was completed on July 13, 1994. TFD was activated on July 14, 1994, and operation began on September 15, 1994. In 1995, TFD processed about 7.9 ML of ground water containing about 5.8 kg of VOCs. The treated water was discharged to a storm water drainage channel discharging into Arroyo Las Positas.

During 1995, Treatment Facility F (TFF) extracted and treated ground water for 5 months during business hours only. Ground water extraction ceased at TFF on April 18 for a 6-month biodegradation study and restarted on October 17. The treatment facility was again shut down on December 8 because of storm damage. With regulatory concurrence, extraction and treatment of the residual dissolved fuel hydrocarbons (FHCs) in two hydrostratigraphic units have been temporarily discontinued in favor of a passive bioremediation approach. We will be submitting a Containment Zone (CZ) report for one hydrostratigraphic unit in the TFF Area to the regulatory agencies in early 1996.

During this period, TFF treated approximately 53 ML of ground water containing a volume-weighted average concentration of FHCs of about 1300 parts per billion (ppb). This is equivalent to about 11 L liquid-volume-equivalent of gasoline removed. In addition, TFF extracted about 40 ML of vapor containing a volume-weighted FHC average concentration of about 20 parts per million (ppm) by volume, for about 2.8 L liquid-volume-equivalent of gasoline removed. Therefore, the total liquid-volume-equivalent of gasoline removed from the TFF subsurface during 1995 was about 13.8 L. Treated waters from TFF were discharged into the sanitary sewer.

Treatment Facility 518 (TF518), which began operating on September 25, 1995, treats soil vapor collected from the vadose zone using a vapor extraction system with granulated activated carbon (GAC) canisters to remove the VOCs. A summary of the 1995 activities for TF518 are listed below:

TF518 has removed 19.9 kg of VOC mass from system startup through December 29, 1995. Four new vadose zone wells were installed during 1995. A VOC soil vapor extraction absorption efficiency test (source test) was conducted at TF518 on October 4, 1995. The source test performed better than required, achieving an abatement efficiency of 99.85%. The results of the source test are summarized in a report prepared by Best Environmental, Inc. (Cartner and Thiry 1995).

Two additional treatment facilities, TFE and TFG, were in the design phase in 1995.

Goals and Progress Summary

In summary, our ground water restoration goals are to hydraulically control and prevent further off-site westward migration of VOC plumes and to remediate plumes in both the off-site and on-site areas. The installation and operation of ground water extraction wells has enabled us to stop off-site VOC migration and remove VOC mass from the ground water, which is reducing VOC plume size. Our remedial efforts, which currently utilize detailed hydrostratigraphic analysis of the ground water bearing strata below the site, enable better targeting of specific contaminant plumes with extraction wells and may allow us to reach our cleanup objectives in an estimated 15-20 years rather than our original goal of 50 years.

Community Relations

The Community Work Group (CWG) met three times in 1995 to discuss topics including: treatment facilities G1 and G2 at the Livermore site; tritium monitoring; results of soil sampling for plutonium at Big Trees Park; the Baseline Environmental Management Report; off-site plume capture; DOE budget status; LLNL's Environmental Restoration Division (ERD) organization; and the Compliance Monitoring Plan.

Other community relations activities in 1995 included communications and meetings with a local interest group and other community organizations; public presentations; distributing the *Environmental Community Letter;* maintaining the Information Repositories and the Administrative Record; conducting tours of the site environmental activities; and responding to public and news media inquiries.

Site 300 Environmental Restoration Program

At Site 300, ongoing remedial investigations, feasibility studies, engineering evaluation and cost analyses, and remedial actions are being performed as a part of the Environmental Restoration Program (ERP). Site 300 investigations and remedial actions are conducted under the joint oversight of the EPA, Central Valley RWQCB, and DTSC under the authority of a Federal Facility Agreement (FFA) for the site (there are separate agreements for Site 300 and the Livermore site). Ground water investigations began in 1981 under the regulatory authority of the Central Valley RWQCB. In August 1990, Site 300 was placed on EPA's National Priorities List under CERCLA. In June 1992, the DOE and LLNL negotiated an FFA that describes the ground water and soil investigations to be conducted and specifies reporting due dates. During 1995, LLNL submitted all regulatory documents and performed all actions stipulated in the FFA on or ahead of schedule.

The study areas and major constituents of concern at Site 300 are shown in **Figure 2-2** and include: (1) General Services Area (GSA)—VOCs, primarily TCE, in soil, rock, and ground water; (2) Building 834 Complex—TCE in soil, rock, and ground water; (3) High Explosives (HE) Process Area—VOCs, primarily TCE and high-explosive compounds (primarily HMX [octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine] and RDX [hexahydro-1,3,5-trinitro-1,3,5-triazine] in soil, rock, and ground water); (4) East and West Firing Areas—tritium, depleted uranium, and VOCs (primarily TCE) in soil, rock, and ground water; (5) Pit 6 Area—VOCs (primarily TCE) in soil, rock, and ground water; and (6) Building 832 Canyon Area (formerly called the Building 833 Area)—TCE in soil, rock, and ground water. These study areas roughly correspond to the programmatic areas at Site 300.

Documentation

Before Site 300 was placed on the National Priorities List, several draft remedial investigation and feasibility study reports were completed for the study areas. The draft remedial investigation reports included detailed discussions of the environment, geology and hydrogeology, environmental risk of any chemicals encountered, and assessment of the potential hazard or risk to public health and safety. The draft feasibility study reports included proposals for remedial action alternatives with cost estimates under several conditions, from no action to full remediation. These reports were submitted to regulatory agencies for consideration of appropriate choices for remediation.

In mid-1991, the regulatory agencies requested that LLNL prepare a sitewide remedial investigation report to replace the previously submitted, area-specific, individual draft remedial investigation reports. The *Final Site-Wide Remedial*

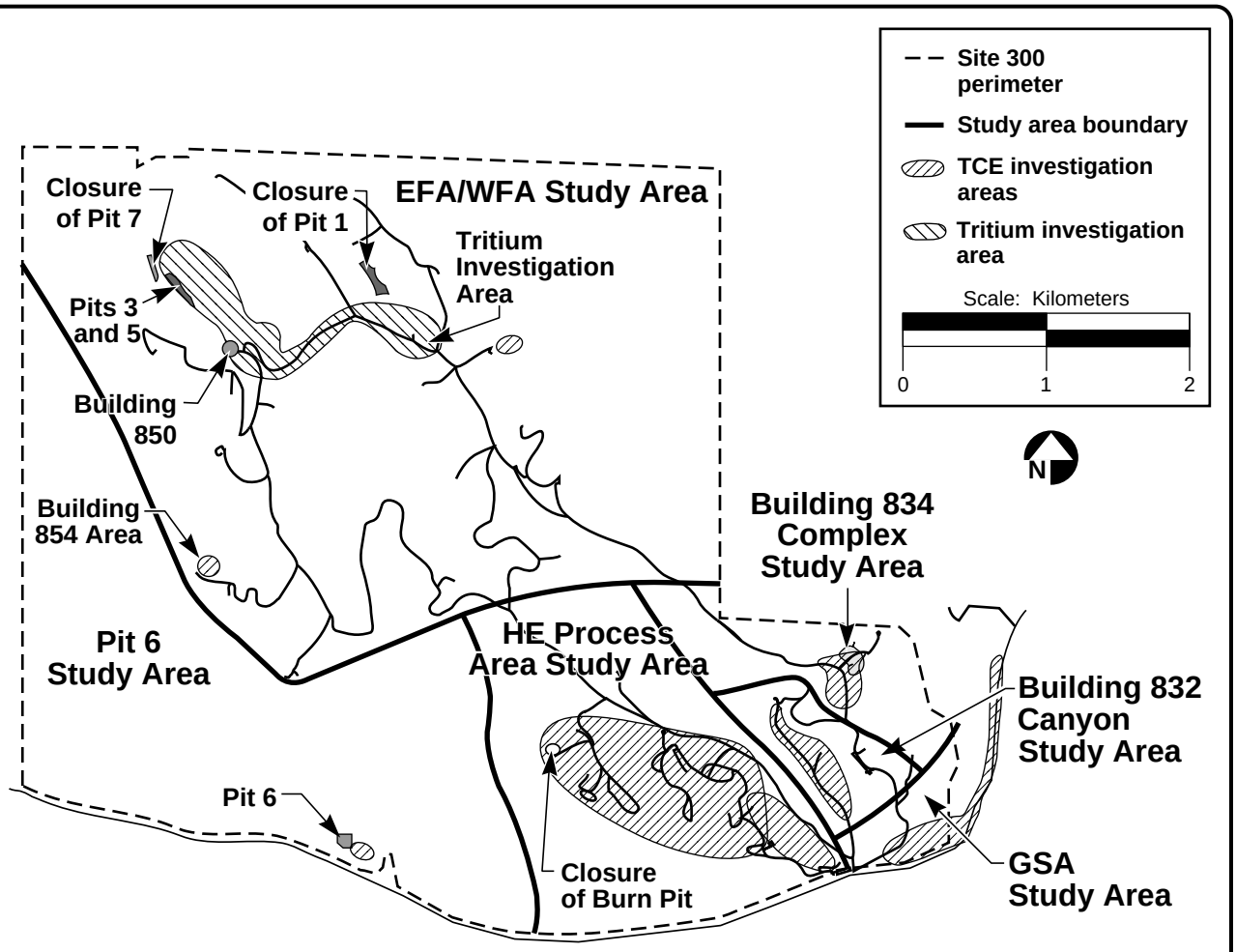

Figure 2-2. Environmental restoration study areas and activities at Site 300.

Investigation Report (Final SWRI report; Webster-Scholten 1994) was submitted to the EPA, Central Valley RWQCB, and DTSC during 1994. The Final SWRI report is organized by study areas, which roughly correspond to the areas covered by the individual remedial investigation reports. It is a thorough compilation of all ground water and soil investigation information for the entire site and contains a detailed assessment of potential human health and ecological hazards or risks resulting from contamination of soil, rock, and ground water. New feasibility study or engineering evaluation/cost analysis (EE/CA) reports have been, or will be, prepared for portions of the individual study areas, termed operable units, where the Final SWRI report or more recent studies indicate that unacceptable potential hazards or risks exist.

During 1995, LLNL submitted to the regulatory agencies the *Final Feasibility Study for the General Services Area Operable Unit* (Rueth and Berry 1995) and the *Final Proposed Plan for the Building 834 Operable Unit* (LLNL 1995a) and the *Draft Proposed Plan for the General Services Area Operable Unit* (LLNL 1995c); the latter reports describe the planned remedial strategies. During 1995, LLNL also submitted to the regulatory agencies the *Final Interim Record of Decision for Building 834* (LLNL 1995b) and the *Draft Evaluation of Remedial Alternatives for the Building 815 Operable Unit of the HE Process Area Study Area* (Madrid and Green-Horner 1995).

In 1995, LLNL made significant progress and is currently finalizing work begun during 1994 with DOE and the regulatory agencies to streamline the Site 300 CERCLA process by reducing the number of documents and by agreeing on a suitable remediation strategy for the two operable units that can be presented in an EE/CA report. Each remedial action would be performed as a CERCLA Removal Action. Prior to finalizing the selection of each Removal Action for these two units, the public would be able to comment at public workshops. This streamlined process is already being applied at Pit 6, where the regulatory agencies will use the Pit 6 Feasibility Study report as an EE/CA and at the Building 815 (HE Process Area study area) and Building 850/Pit 7 Complex (East and West Firing Area study area) operable units. Additional EE/CA reports may be prepared if investigative activities planned at the Building 832 Canyon area and the Building 854, Building 812, and Sandia Test Site areas (East and West Firing Area study area) indicate unacceptable risks or hazards.

General Services Area

This study area is located in the southeastern corner of Site 300. Since 1982, LLNL has conducted an intensive investigation in the GSA and off-site areas to locate VOC release points and to define the vertical and horizontal distribution of VOCs, primarily TCE and PCE, in the soil, rock, and ground water. According to the Final SWRI and *Draft Remedial Investigation* (McIlvride et al. 1990) reports, VOCs in excess of drinking water maximum contaminant levels (MCLs) have been identified in the shallow ground water beneath the GSA in two localities. Two small VOC plumes occur in the central portion of the study area, and one VOC plume occurs in the eastern section in the gravels of Corral Hollow Creek. An air-sparging ground water treatment unit that removes VOCs from the eastern GSA ground water began operation in June 1991 as a CERCLA Removal Action and has been operated throughout 1995. The total volume of water treated here through December 1994 was about 190 ML; 2.9 kg of VOCs were removed from the water. The treated ground water was discharged off site to the Corral Hollow Stream Channel, in accordance with WDR Order No. 91-052 NPDES Permit No. CA0082651. During 1995, an additional 73 ML of ground

water in the eastern GSA was treated to remove approximately 1.4 kg of VOCs. Before cleanup was initiated, this plume extended about 1200 m off site; it now extends only 300 m off site. LLNL estimates that 10 more years of ground water extraction and treatment will be required to achieve and maintain ground water VOC concentrations below MCLs at the eastern GSA.

The two VOC ground water plumes in the central GSA are present in alluvium and shallow bedrock and in deeper bedrock. Construction of an air-sparging ground water treatment and vapor extraction unit for a CERCLA Removal Action to remove VOCs from the central GSA ground water and soil vapor was completed in 1993. During 1993, ground water extraction and treatment began. During 1993 and 1994, about 0.90 ML of ground water containing 2.4 kg of VOCs were treated. During 1995, an additional 0.89 ML of ground water containing 0.88 kg of VOCs was treated. The treated ground water was collected and batch discharged in a remote Site 300 canyon, in accordance with substantive requirement agreements issued by the Central Valley RWQCB. Pilot soil vapor extraction and treatment of VOCs began in 1993. During 1993 and 1994, 3000 m^3 of soil vapor were treated with carbon adsorption to remove 7.6 kg of VOCs. During 1995, an additional 180,000 m^3 of soil vapor were treated to remove 17 kg of VOCs. Soil vapor extraction and treatment are ongoing. LLNL estimates that an additional 10 years of soil vapor extraction and 55 years of ground water extraction are required to achieve and maintain ground water VOC concentrations below MCLs at the central GSA.

The *Final Feasibility Study Report for the General Services Area Operable Unit* (Rueth and Berry 1995) defines the extent of ground water contamination and was submitted to the regulatory agencies on October 31, 1995. The *Draft Proposed Plan for the General Services Area Operable Unit* (LLNL 1995c) was submitted on December 15, 1995, and describes the planned remedial strategies for public evaluation.

Building 834 Complex

The Building 834 Complex is located in the eastern portion of Site 300. An isolated, perched water-bearing zone that contains TCE in excess of the MCL of 5 ppb has been defined and reported in the Final SWRI report, *Draft Remedial Investigation and Feasibility Study for the Lawrence Livermore National Laboratory Site 300 Building 834 Complex* (Bryn et al. 1990), and the *Final Feasibility Study Report for the Building 834 Operable Unit* (Landgraf et al. 1994). Techniques have been evaluated and pilot-tested to remove TCE vapor from the vadose zone above the water table and from the shallow perched water. Water was extracted by pumping from ground water extraction wells and from soil vapor extraction wells under vacuum. Pilot remediation began during 1993 at the Building 834

Complex, where about 300 kg of TCE was removed from the unsaturated sediment soil vapor and ground water by extraction and treatment. Ground water has been treated by air sparging. Vapor-phase TCE has been treated by carbon adsorption; successful experiments have been conducted at Building 834 for the breakdown of TCE with ultraviolet-light flash lamps and an electron beam accelerator. During 1993, the pilot extraction system was upgraded in preparation for a CERCLA Removal Action. Proof-of-system testing was conducted during 1994. During 1995, 9700 L of ground water was extracted to treat 0.36 kg of VOCs (primarily TCE) by air sparging. The resulting clean effluent water was misted to air by elevated sprinklers located immediately southeast of the Building 834 Complex. This unique design allows for the rapid evaporation of the clean effluent water and prevents surface erosion and ground water recharge.

During 1995, LLNL submitted the *Final Proposed Plan for the Building 834 Operable Unit* (LLNL 1995a) to the regulatory agencies; this report describes the planned remedial strategies for the public. During 1995, LLNL also submitted to the regulatory agencies the *Final Interim Record of Decision for the Building 834 Operable Unit* (LLNL 1995b). The proposed remedial strategy for the operable unit is ground water and soil vapor extraction and treatment. The interim Record of Decision (ROD) provides for the application of innovative technologies such as surfactants for enhanced removal by soil vapor and ground water extraction.

High Explosives Process Area

During ground water field investigations conducted in the mid-1980s, concentrations of TCE and nitrate above MCLs and concentrations of the high-explosive (HE) compound RDX were discovered in two perched, water-bearing zones within the HE Process Area near Buildings 815 and 817 (Crow and Lamarre 1990; Webster-Scholten 1994). Until 1985, process rinse water from buildings within the HE Process Area was disposed of in unlined lagoons adjacent to the processing buildings. The lagoons were closed and capped with impermeable clay in 1989. Sporadic, but generally low, concentrations of HE compounds, metals, and VOCs were identified in the vadose zone beneath some of the lagoons, but these contaminants have not migrated to the underlying ground water (Webster-Scholten 1994). During 1994, additional investigations were conducted in the study area, and the full extent of the contamination has been determined. The feasibility study for the Building 815 operable unit was replaced by a streamlined *Draft Evaluation of Remedial Alternatives Report* (Madrid and Green-Horner 1995) for the Building 815 Operable Unit, which was submitted to the regulators on December 15, 1995. During 1995 our continued assessment of chemical data indicates that natural attenuation is reducing the extent and maximum concentration of VOCs in the HE Process Area ground

water. The current remedial strategy is on hold pending further well installation, investigation, and modeling of ground water chemistry immediately downgradient (south) of the Building 815 operable unit.

East and West Firing Areas

Debris from explosive tests historically conducted at seven firing tables (Buildings 801, 802, 804, 812, 845, 850, and 851) in this study area in the northern part of Site 300 was disposed of in adjacent unlined landfill pits. These landfill pits are designated Pits 1, 2, 8, and 9 in the East Firing Area (EFA) and Pits 3, 4, 5, and 7, collectively termed the Pit 7 Complex, in the West Firing Area (WFA). In 1981, the Hazardous Waste Assessment study of the hydrology, geology, and ground water chemistry associated with Site 300 landfills was initiated. As part of this project, monitoring wells were installed at the landfills, and a program of periodic ground water monitoring was initiated. In 1984, tritium activities in water from four of the wells rose above the California MCL for drinking water, which is 740 becquerels per liter (Bq/L) (20,000 picocuries per liter [pCi/L]).

A tritium investigation was initiated, and two areas where tritium occurs in ground water above background activities and MCLs were delineated: (1) the Pit 7 Complex and (2) the area encompassing Building 850, Doall Road, and Elk Ravine in the East and West Firing Areas. This area defines the Building 850/Pit 7 Complex Operable Unit. **Figure 2-3** shows the distribution of tritium in ground water for April–May 1995. The Final SWRI report indicates that, at Building 850, tritium was released to the subsurface by percolation of rainfall runoff and dust-control water through contaminated Building 850 firing-table gravels to ground water. In the Pit 7 Complex, tritium was released to ground water from Pits 3 and 5 by heavy winter rains in 1982–1983, 1986–1987, 1991–1992, 1993–94, and the resulting rising water tables. Computer modeling of the transport and fate of the tritium indicates that by the time the tritiated water from sites of known ground water contamination reaches the Site 300 boundary, the tritium will have decayed to near background activities. Details of the remedial investigation for the East and West Firing Areas are discussed in several reports including Taffet et al. (1989) and the Final SWRI report. Past monitoring has also revealed trace amounts of TCE in ground water near the Pit 7 Complex (from Pit 5) and at Building 801. Freon-113 at concentrations significantly below the California maximum contaminant level of 1.2 ppm is present near Pit 1 and is the result of spills at Building 865 (Advanced Testing Accelerator).

During 1995, total uranium activities in excess of the State MCL of 0.74 Bq/L (20 pCi/L) continued to be measured in samples from several ground water monitoring wells at the Pit 7 Complex; several of these wells also yielded samples bearing isotopic ratios indicative of depleted uranium. Conversely,

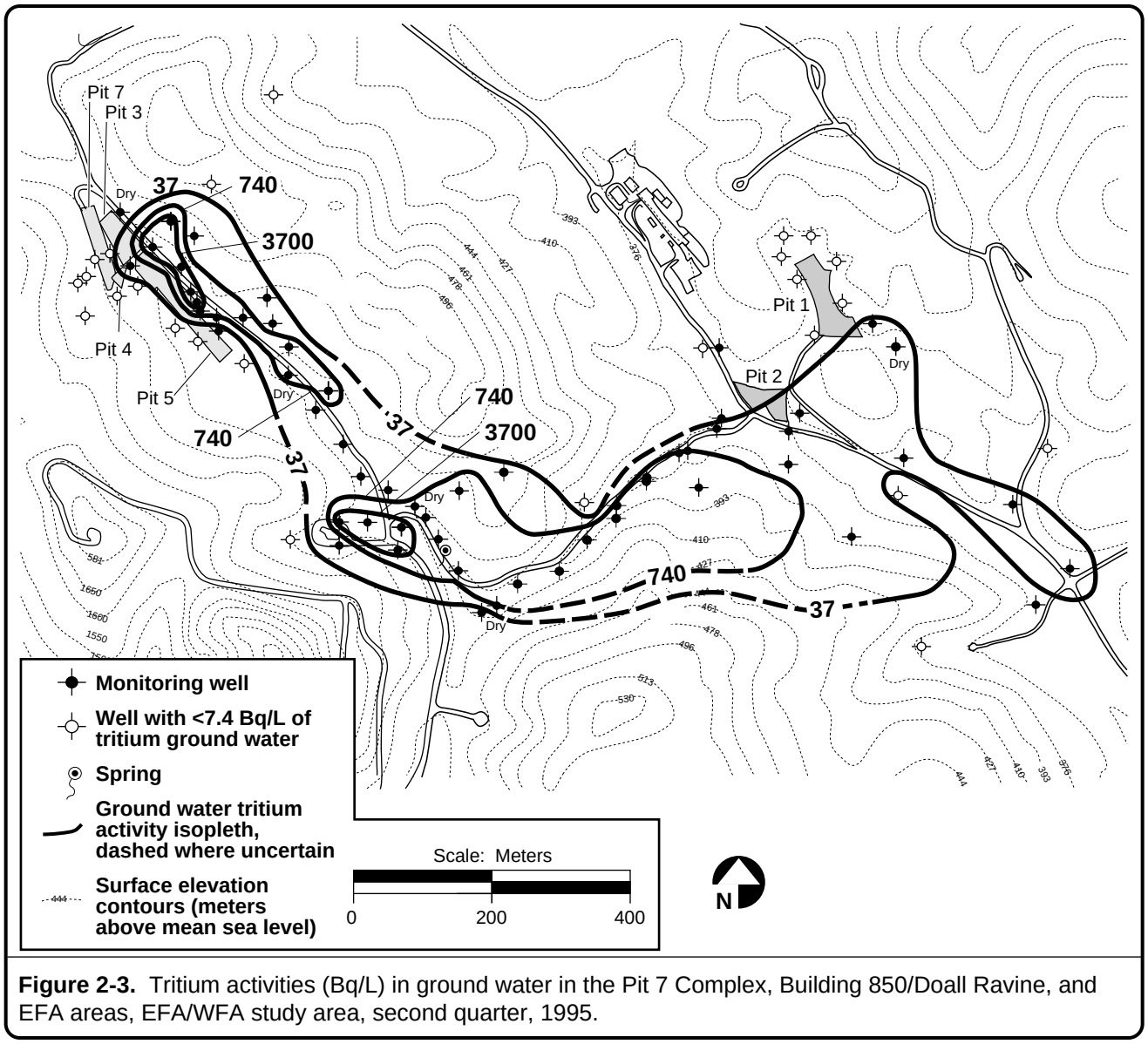

Figure 2-3. Tritium activities (Bq/L) in ground water in the Pit 7 Complex, Building 850/Doall Ravine, and EFA areas, EFA/WFA study area, second quarter, 1995.

samples of ground water from several wells in the area contain uranium activities that exceed the State MCL but bear natural uranium isotopic signatures. Analyses of ground water samples from several wells adjacent to Building 850 also indicate depleted uranium signatures; these samples do not exceed the state MCL for uranium. Additional field work was conducted during 1995 at Building 850 and Pits 3 and 5 to define the nature and extent of uranium isotopes, polychlorinated biphenyls (PCBs), dioxins and furans, and VOCs in soil, rock, and ground water. As a result, we have defined three small plumes of uranium in ground water, emanating from each of Pits 5 and 7 and the Building 850 firing table. Ground water fate and transport modeling indicates that total uranium

activity will be at background levels by the time any depleted uranium-bearing ground water reaches the Site 300 boundary. Although PCBs, dioxins, furans, and depleted uranium were found in soils on the slopes above the Building 850 firing table to a maximum depth of about 1 m, no VOCs or PCBs were detected in surface or subsurface soil and rock collected near Pits 3 and 5. During 1995, these chemical results were integrated into a SWRI Addendum Report for the Building 850/Pit 7 Complex Operable Unit (Taffet et al. 1996). This report was submitted to the regulatory agencies during February 1996 and includes a revised risk assessment for the operable unit. During 1995, LLNL prepared an evaluation of treatment technologies for tritium-bearing ground water (LLNL 1996); this report also was submitted to the regulatory agencies during February 1996. Remedial actions at the operable unit will be carried out as CERCLA Removal Actions. These actions will likely consist of impermeable barriers and subsurface drains designed to keep water out of contaminant sources.

Characterization plans for the Building 854, Building 812, and Sandia Test Site portions of the East and West Firing Areas were submitted to the regulatory agencies during 1994. At the Building 854 Complex, prototype weapons parts have been subjected to environmental stresses. Several large leaks of TCE occurred here in the past. Characterization work began at the Building 854 Complex in the spring of 1995. This work included geological reconnaissance, surface soil sampling, a passive soil vapor survey, monitor well drilling and completion, and borehole-core chemical analysis.

Pit 6 Area

The Final SWRI report and *Draft Remedial Investigation of Landfill Pit 6* (Taffet 1990) discuss the small plume of TCE (in excess of MCLs) in ground water that discharges to the surface at small springs at the southeastern edge of the Pit 6 area. The source of the TCE plume is the southeast corner of the Pit 6 landfill. Because of natural volatilization of affected ground water at the springs, concentrations of VOCs in the plume have declined by over an order of magnitude since 1992. The *Final Feasibility Study Report for the Pit 6 Operable Unit* (Devany et al. 1994) discusses options for remediation in this area. The regulatory agencies have agreed to accept this document as an EE/CA report for a removal action. The removal action includes installation of an impermeable cover, surface drainage diversion system, and several additional monitoring wells. The removal action construction is scheduled for completion by December 1, 1997.

Building 832 Canyon Study Area

Low concentrations of TCE and associated VOCs have been detected in shallow soils and sediments (to a depth of 15 m) beneath the Building 832 Canyon Study

Area (formerly the Building 833 study area). During the remedial investigation of the Building 833 area, VOC concentrations of up to 1800 ppb were detected in ground water samples from two boreholes. Results of the investigation were published in the Final SWRI report and in the *Draft Remedial Investigation of the Building 833 Area* (Webster-Scholten et al. 1991). Although past investigations documented in the Final SWRI report do not indicate risk or hazard above acceptable levels within Building 833, additional investigation began in 1994 at the Building 832 Canyon area. This investigation is scheduled for completion during 1997. Remedial actions will be evaluated if unacceptable risk or hazard is indicated at the Building 832 Canyon area.

Community Relations

The Site 300 CERCLA project maintains proactive communication with the surrounding communities of Tracy and Livermore. Community relations activities conducted during 1995 included continued dialogue with Tri-Valley CAREs, maintenance of the information repositories and administrative records, Site 300 tours for scientists and students from universities and local public schools, support for off-site, private, well-sampling activities, and preparation of a third Site 300 Environmental Restoration fact sheet. This fact sheet will be published during early 1996.

SARA, Title III

Title III of the Superfund Amendment and Reauthorization Act (SARA) of 1986 is known as the Emergency Planning and Community Right-to-Know Act (EPCRA). It requires owners or operators of facilities that have certain hazardous chemicals on site to provide information on the release, storage, and use of those chemicals to organizations responsible for emergency response planning. Executive Order 12856, signed by President Clinton on August 3, 1993, directs all federal agencies to comply with the requirements of EPCRA, including the SARA 313 Toxic Release Inventory Program.

Section 302 of EPCRA requires the owner or operator of any facility at which a listed extremely hazardous substance is present in amounts equal to or greater than specified threshold planning quantities to notify the State Emergency Response Commission (SERC), which in California is the Chemical Emergency Planning and Response Commission (CEPRC), that the facility is subject to the emergency planning requirements. Section 303 of EPCRA requires the owner or operator of the facility to designate a facility representative to participate in local emergency planning as a facility emergency response coordinator. LLNL submits Section 302 and 303 information to CEPRC and periodically updates emergency contact information with revised Section 311 submittals described below. In 1995, these updates were submitted to the CEPRC on January 27 and June 20.

Section 304 of EPCRA requires that releases of certain hazardous substances that are not federally permitted must be immediately reported to the SERC and Local Emergency Planning Committee (LEPC). LLNL did not release a hazardous substance requiring notification under Section 304 during 1995.

Section 311 of EPCRA requires the owner or operator of a facility that is required to prepare or have available a Material Safety Data Sheet (MSDS) for a hazardous chemical under the Occupational Safety and Health Act (OSHA) of 1970 to submit an MSDS for each chemical (or a list of such chemicals) to the SERC, LEPC, and local fire department if the amount of the chemical equals or exceeds threshold amounts. LLNL provided two updates to its Section 311 submittals during 1995. **Tables 2-2** and **2-3** identify those chemicals reported by LLNL for the Livermore site and Site 300 under Section 311 during 1995.

Section 312 of EPCRA directs the owner or operator of a facility required to prepare or have available an MSDS for a hazardous chemical under OSHA to prepare and submit an emergency and hazardous chemical inventory form by March 1 of each year if the amount of the chemical equals or exceeds threshold amounts. In California, submittal of chemical inventory information under provisions of California Health and Safety Code Chapter 6.95 (Hazardous Material Release Response Plans and Inventory or "Business Plan") is deemed to meet the requirements of EPCRA Section 312. LLNL has previously submitted separate Business Plans and related chemical inventory information to San Joaquin and Alameda Counties for Site 300 and the Livermore site and updated each of these plans three times during 1995.

Section 313 of EPCRA, the Toxic Release Inventory (TRI) reporting program, requires the owner or operator of certain facilities that manufacture, process, or otherwise use listed toxic chemicals above threshold amounts to submit annually to EPA and designated state officials annual toxic chemical release inventory forms (FORM R) for such toxic chemicals released into the environment. Executive Order 12856 directs federal agencies to report under Section 313 , beginning with reporting year 1994. As required by this Executive Order, LLNL submitted to DOE on June 9, 1995, Form Rs for sulfuric acid and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113) for the Livermore site. DOE subsequently submitted the two Form Rs to USEPA and the State of California.

A summary of LLNL compliance with EPCRA in 1995 follows:

EPCRA 302–303: Planning notification	Yes [X]	No [ ]	Not Required [ ]
EPCRA 304: EHS Release notification	Yes [ ]	No [ ]	Not Required [X]
EPCRA 311–312: MSDS / Chemical Inventory	Yes [X]	No [ ]	Not Required [ ]
EPCRA 313: TRI Reporting	Yes [X]	No [ ]	Not Required [ ]

Table 2-2. Livermore site, SARA, Title III, Section 311, Chemical List.

Livermore site chemicals	Physical hazards			Health hazards	
	Fire	Pressure	Reactivity	Acute	Chronic
Argon		X		X	
Carbon monoxide		X		X	
Diesel fuel	X				
Ethylene glycol				X	
Freon 11				X	
Freon 12				X	
Freon 113				X	
Gasoline	X				
Helium		X		X	
Hydrofluoric acid		Some containers	X	X	X
Hydrogen peroxide (<52%)			X		
Lead (bricks and ingots)				X	X
Nitric acid	X		X	X	X
Nitrogen		X		X	
Oxygen		X	X		
Paint	X				
Propane	X				
Sodium hypochlorite/bleach				X	X
Stoddard solvent/thinner	X			X	
Sulfuric acid			X	X	X

Table 2-3. Site 300, SARA, Title III, Section 311, Chemical List.

Site 300 chemicals	Physical hazards			Health hazards	
	Fire	Pressure	Reactivity	Acute	Chronic
Chlorine		X		X	
bis (2,2-dinitro-2-fluoroethyl) formal in methylene chloride	—[a]		—[a]	X	X
Diesel fuel	X				
Gasoline	X			X	
High explosives			X		
Lead (bricks)				X	X

[a] Dangerous fire or explosion risk in neat form (solvent evaporates).

ChemTrack

ChemTrack, a computerized chemical inventory system, is an important tool for ensuring compliance with SARA Title III and California Business Plan reporting requirements and improving the overall management of hazardous materials at LLNL. It tracks chemical inventories at LLNL through the use of bar codes, laser scanners, and customized software and enhances LLNL's ability to obtain toxic release information necessary to complete SARA 313 submittals. ChemTrack currently has an inventory of approximately 200,000 chemical containers ranging from 210-L drums to gram-quantity vials. A Business Plan inspection of Site 300 conducted by the San Joaquin Office of Emergency Services on September 21, 1995, found no violations.

In addition, ChemTrack includes a chemical locating service that allows LLNL researchers to find and share chemicals. This minimizes the purchase of new chemicals, thereby reducing procurement costs and the generation of hazardous waste. Also, ChemTrack data is being used by various LLNL organizations to improve emergency response planning and management of Material Safety Data Sheets, to more closely track specific high-hazard chemicals and other regulated substances, and as a screening tool for conducting preliminary hazard analyses of selected LLNL facilities.

Clean Air Act/Air Quality Management Activities

Air permits are obtained from the Bay Area Air Quality Management District (BAAQMD) for the Livermore site and from the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) for Site 300. In 1995, BAAQMD issued or renewed 178 permits to operate for the Livermore site. Two boilers were replaced at B131 and two boilers were retrofitted in B231, in compliance with BAAQMD Regulation 9, Rule 7. In 1995, SJVUAPCD issued or renewed 41 permits for Site 300.

Inspections

On February 7, 1995, the BAAQMD conducted an inspection of an asbestos removal project at the Livermore site. No deficiencies were noted during the inspection. There were no other air inspections at the Livermore site in 1995. The BAAQMD evaluated the need for other types of inspections based upon the size or amount of air emissions and classified LLNL as an insignificant source since total annual emissions do not exceed regulatory thresholds.

The SJVUAPCD conducted no inspections at Site 300 during 1995. (At Site 300, the interval for annual inspections has been slightly more than 12 months.) An inspection is expected during the spring of 1996.

National Emission Standards for Hazardous Air Pollutants

Demonstration of compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for radionuclide emissions (Radionuclide NESHAPs, 40 CFR 61, Subpart H) requires that all potential sources of radionuclide air emissions be evaluated to determine the possible effective dose equivalent to the maximally exposed individual member (MEI) of the public. These evaluations include air surveillance monitoring and modeling based on radionuclide inventory data, effluent (source emission) monitoring, or both.

Compliance with two dose limits must be evaluated. First, the sum of all effective dose equivalents to the MEI from all radionuclide emissions to air must not exceed 100 microsieverts per year (μSv / y) (10 millirem per year [mrem / y]). Second, all emission points with the potential for unmitigated emissions resulting in any effective dose equivalent greater than 1 μSv / y (0.1 mrem / y) must have continuous monitoring systems that meet the requirements stated in the regulations.

The *LLNL NESHAPs 1995 Annual Report* (Gallegos et al. 1996) reported to DOE and EPA the total calculated sitewide MEI effective dose equivalents for the Livermore site and Site 300 as 0.41 μSv / y (0.041 mrem / y) and 0.23 μSv / y (0.023 mrem / y), respectively. The reported doses include contributions from both point sources and diffuse sources. Modeling was based on a combination of effluent monitoring data and radionuclide inventory data. The totals are well below the 100 μSv / y (10 mrem / y) dose limits defined by the NESHAPs regulations. The details of these data are included in this report (see Chapter 13). The total calculated 1995 MEI effective dose equivalents for the Livermore site and Site 300 are slightly smaller than those reported for 1994, when the effective dose equivalent values were 0.65 μSv / y (0.065 mrem / y) for the Livermore site and 0.81 μSv / y (0.081 mrem / y) for Site 300.

LLNL is committed to maintain continuous radionuclide emissions monitoring of Building 331, Building 332, and the hardened portion of Building 251; such monitoring already exists in these buildings. Continuous monitoring will also be maintained at six other buildings. Inspections of these sampling systems indicated that representative sampling is being performed.

Clean Water Act and State Programs—Waste Discharge Requirements

Preserving clean water is the subject of local, state, and federal regulations. The National Pollutant Discharge Elimination System (NPDES) under the Federal Clean Water Act establishes permit requirements for discharges into navigable waterways. In addition, the State of California requires permits, known as Waste Discharge Requirements (WDR) for any discharges of wastes affecting the beneficial uses of waters of the state. The Regional Water Quality Control Boards (RWQCBs) are responsible for issuing and enforcing both permits. The Livermore Water Reclamation Plant (LWRP) requires permits for wastewater

discharges to the city sanitary sewer system. The Army Corps of Engineers (COE) is responsible for work in navigable waterways below the normal high water mark and for controlling dredge and fill operations in waters of the United States. The California Department of Fish and Game (CDFG) under the Fish and Game Code Section 1601 et al. requires streambed alteration agreements for any work that may disturb or impact rivers, streams, or lakes. Finally, the Safe Drinking Water Act (SWDA) requires registration and management of injection wells to protect ground water sources of drinking water.

Ground Water and Surface Water Discharge Permits

WDR Order No. 88-075, issued by the San Francisco Bay RWQCB, pertains to activities undertaken to investigate and remediate contaminants in ground water at the Livermore site. The order allows treated ground water that meets specified standards to be discharged to specified areas on DOE property. LLNL also holds an NPDES permit (CA0029289, WDR Order No. 91-091) for treated ground water discharged to the ground, storm drains, arroyos, injection wells, and infiltration trenches at the Livermore site. The treated ground water is from ground water investigation monitoring wells and ground water treatment facilities. As adopted into the CERCLA Record of Decision, LLNL follows the substantive requirements of CA0029289 as applicable, relevant, and appropriate requirements. The administrative requirements of this permit, including reporting, payment of fees, and permit renewal, are no longer followed. The self-monitoring programs required by this permit and the CERCLA Record of Decision are described in Chapter 14 on Compliance Self-Monitoring. Analytical results are presented in the *LLNL Ground Water Project 1995 Annual Report* (Hoffman et al. 1995a) and *LLNL Ground Water Project Quarterly Reports* (Berg et al. 1995*)* submitted under CERCLA.

The Livermore site also discharges storm water associated with industrial activities and low-threat non-storm water under an NPDES permit (CA0030023, WDR 95-174). LLNL submitted a discharge application to the San Francisco Bay RWQCB in April 1995 for low-threat non-storm water discharges and storm water discharges associated with industrial activities. The NPDES permit was issued in August 1995 allowing discharges of storm water associated with industrial activity and five categories of low-threat discharges (building conduits, equipment sources, building and ground maintenance, fire suppression and other safety systems, and water systems). Upon issuance of the NPDES permit, coverage of storm water discharges associated with industrial activities under the California General Industrial Storm Water Permit (WDR Order No. 91-13-DWQ, as amended by Order No. 92-12-DWQ, NPDES General Permit No. CAS000001) was rescinded.

In addition to storm water discharges associated with industrial activities, LLNL continued construction operations for Building 132 under coverage of the California General Construction Activity Storm Water NPDES Permit. The

Notice of Intent for this project was submitted to the State Water Resources Control Board on September 30, 1992. LLNL also submitted a Notice of Intent on September 29, 1995, for the construction activity associated with non-hazardous permitted portions of the Decontamination and Waste Treatment Facility (DWTF) and Mixed Waste Management Facility (MWMF).

The self-monitoring programs required by these permits and associated analytical results are detailed in Chapters 7 and 14.

Storm water from LLNL's Drainage Retention Basin is discharged under the authority of the CERCLA Record of Decision through reference to WDR Order No. 91-091. The self-monitoring agreement submitted to the San Francisco Bay RWQCB for discharges from the Drainage Retention Basin and associated analytical results are discussed in Chapter 14.

Site 300 discharges storm water associated with industrial activity, routine blow-down water from three cooling towers, and emergency blowdown water from 14 additional cooling towers under NPDES Permit No. CA0081396, WDR Order No. 94-131. Routine cooling tower blowdown discharges from the 14 cooling towers were engineered to percolation pits and discharged to these pits under a Waiver of Waste Discharge Requirements issued by the Central Valley RWQCB on February 6, 1995. In August 1994, LLNL submitted to the Central Valley RWQCB a technical report discussing low-threat non-storm water discharges occurring at Site 300. The Central Valley RWQCB has not yet acted on LLNL's request for an NPDES permit for these discharges but provided written notification to LLNL that these discharges may continue until it issues the permit. LLNL submitted a revision to this technical report on December 1, 1995, indicating that several of the low-threat discharges were engineered to percolation pits and requested a waiver for these discharges and an NPDES permit for the remaining low-threat non-storm water discharges to surface water. The Central Valley RWQCB has not yet acted on these requests. The self-monitoring program for storm water discharges and associated analytical results are detailed in Chapters 7 and 14. The cooling tower self-monitoring program and associated analytical results are detailed in Chapter 14.

A Notice of Termination of coverage for the Site 300 Doall Road project under the general construction activity permit was submitted to the Central Valley RWQCB on February 8, 1995.

Site 300 operates under three additional permits and two substantive requirement agreements issued by the Central Valley RWQCB: WDR Order No. 93-100 pertains to ongoing post-closure monitoring requirements for landfill Pits 1 and 7; WDR Order No. 85-188 is a permit for operation of the domestic sewage lagoon, domestic septic tanks and associated leach fields, and the Class II surface

impoundments for high-explosives rinse waters, chemistry building wastewaters, and photo process rinse waters. A revised report of waste discharge to update WDR Order No. 85-188 was submitted at the request of the Central Valley RWQCB on June 29, 1994. Subsequently, LLNL received a Notice of Violation (NOV) on April 20, 1995, from the Central Valley RWQCB for the unpermitted discharge of wastes to the Class II surface impoundments. (This is reported in the tabulation of Environmental Occurrences **Table 2-5** at the end of this chapter under the date February 10.) As required by the NOV, LLNL submitted an additional Report of Waste Discharge for the operation of the Class II surface impoundments, updating information previously provided to the Regional Board. The Central Valley RWQCB is reviewing the submitted Reports of Waste Discharge and should issue new waste discharge requirements in 1996. We anticipate no further action on the NOV after issuance of the new WDR Order. The self-monitoring programs for WDR Order Nos. 93-100 and 85-188 and associated analytical results reported to the Central Valley RWQCB are described in Chapters 8 and 14.

WDR Order No. 91-052 (NPDES Permit No. CA0082651) is a permit to discharge treated ground water from the eastern GSA ground water treatment facility to Corral Hollow Creek. LLNL submitted a permit application to renew this NPDES permit to the Central Valley RWQCB on February 7, 1996. Two ground water treatment facilities at Site 300 (central GSA and Building 834) operate under substantive requirements issued by the Central Valley RWQCB and agreed to by LLNL as part of the CERCLA process. The substantive requirements for these facilities include proof-of-system and full-scale operation evaluations of the hardware, monitoring of physical properties in the subsurface and influent and effluent chemical concentrations, and regular reporting to the regulatory agencies. The self-monitoring programs for the ground water treatment permit and substantive requirements are also discussed in Chapter 14.

Both the Livermore site and Site 300 are implementing Storm Water Pollution Prevention Plans that were adopted in May 1994. The Storm Water Monitoring Programs were implemented by January 1, 1993, as required by the California General Industrial Activity Permit. The Site 300 Storm Water Monitoring Program was updated July 1994 as required in WDR Order No. 94-131.

Inspections

The San Francisco Bay RWQCB inspected the Livermore site on July 18 and October 25, 1995, to observe LLNL cooling tower heat exchanger operation. On the basis of these inspections, LLNL was able to show wastewater from this operation could be adequately controlled with administrative and minor structural best management practices to ensure discharges did not reach the

storm drainage system. No findings or Notices of Violations (NOVs) resulted from this inspection.

The San Francisco Bay RWQCB staff also visited the Livermore site on September 6, 1995. Various water permitting issues were discussed and a tour was conducted of the areas of streambed work, the Drainage Retention Basin, and the cooling towers.

The Central Valley RWQCB met with LLNL staff on September 12, 1995, to gain a better understanding of LLNL's response to the NOV related to the discharge to Class II surface impoundments, to observe the surface impoundments that were reported leaking in June 1995, and to observe new CERCLA well location sites. The Central Valley RWQCB inspected Site 300 permitted operations on December 19, 1995, to observe repairs made to the Class II surface impoundment liner. No findings or NOVs resulted from these inspections.

Wastewater Permits

A Wastewater Discharge Permit from the LWRP provides for the continued discharge of LLNL sanitary and industrial effluent to the city sewer system. Permit No. 1250 (94-95) was in effect from September 1994 through September 1995, and renewal Permit No. 1250 (95-96) is effective from September 1995 to September 1996. Under the provisions of this permit, LLNL conducts a self-monitoring program at its outfall into the Livermore sewer system. Continuous daily, weekly, and monthly effluent sampling is performed to satisfy permit compliance requirements. The monitoring results of the LLNL effluent are reported monthly to the LWRP. LLNL is seeking an EPA exemption from continued compliance with the Categorical Standards, because we believe the categorical wastewater standards were not written or intended for research and development facilities. Therefore, self-monitoring of categorical processes, as well as writing of semiannual reports, were suspended by the LWRP until further notice.

The self-monitoring program, including a discussion of analytical results for this wastewater discharge, is detailed in Chapters 6 and 14. There were no NOVs for wastewater discharges during 1995.

LLNL renewed two permits issued by the LWRP for discharges of treated ground water to the sanitary sewer during 1995: (1) ground water discharge Permit No. 1508G (95-96) for discharge of sewerable waste from TFF and (2) ground water discharge Permit No. 1510G (95–96) for a sitewide treatability study. Discharges from TFF to the sanitary sewer are monitored quarterly and reported semiannually to the LWRP. Discharges to the sanitary sewer are monitored for the sitewide treatability study and reported annually. These self-monitoring

programs and the associated analytical results documenting compliance with the self-monitoring provisions of these permits are detailed in Chapter 14.

Inspections

LWRP personnel spent 2 days on site during 1995 in May and June. The May visit involved routine inspection and sampling of pretreatment discharges. In July, the LWRP inspectors returned accompanied by the EPA Region IX Enforcement Inspector on a 3-day inspection of LLNL. The inspection was part of a larger EPA audit of the LWRP. No findings or NOVs were issued by the LWRP or the EPA as a result of these inspections.

Streambed Alteration Agreements

California Department of Fish and Game (CDFG) issued five streambed alteration agreements for construction and maintenance projects within arroyos near Livermore site facilities during 1995. On May 22, 1995 , LLNL submitted an application for the Electrical Power Distribution System Retrofits and Upgrades (EPSRU) project to cross Arroyo Las Positas in both the northwest and northeast corners of the site. The agreement for this project is effective June 1, 1995, through June 1, 1996. On May 24, 1995, LLNL submitted an application for work conducted in Arroyo Mocho (located 8.5 miles southeast of LLNL on an easement road off Mines Road, at the 5.65-mile road marker) to repair damage to a utility access road caused by mudslides. The agreement for this project was effective July 1, 1995, through September 1, 1995. On June 9, 1995, LLNL submitted a streambed alteration agreement for emergency work that occurred in Arroyo Seco (covering an area located west of the LLNL southwest entrance off of East Avenue to the Vasco Road crossing) from March 29, 1995, through April 5, 1995, to repair storm damage. The work was conducted on verbal approval provided by the CDFG warden on March 28, 1995. On July 28, 1995, LLNL submitted an application for culvert removal and outfall repairs in Arroyo Las Positas. The culvert was removed at the northeast corner of the site where Arroyo Los Positas enters LLNL and along the east perimeter of the site east of Building 661. Repair on the outfall was conducted at the northeast corner of LLNL, where the arroyo turns north and moves toward Patterson Pass Road.

The streambed alteration agreement for this project was effective July 30, 1995, through September 30, 1995. Finally, an application was submitted on August 10, 1995, for bank stabilization in Arroyo Las Positas to accommodate increased storm water discharge flows as a result of site improvements associated with the construction of Decontamination Waste Treatment Facility and the Mixed Waste Management Facility. The streambed alteration agreement for this project is effective from October 1, 1995, through October 1, 1996.

CDFG issued four streambed alteration agreements for construction and maintenance projects impacting the natural drainage at Site 300. On November 7, 1994, CDFG issued a 5-year maintenance streambed alteration agreement that allows for the removal of vegetation in Corral Hollow Creek. The vegetative growth results from the discharge of treated ground water from the eastern GSA treatment facility (Site 300) and must be removed to prevent flooding of California Department of Forestry property south of the GSA. On May 22, 1995, CDFG issued a 5-year maintenance agreement for work in the LLNL Site 300 drainage channels. A one-time agreement was issued on February 21, 1995, to extend a fire trail across Elk Ravine. On December 8, 1994, a streambed alteration agreement was issued for installation of water monitoring samplers in tributaries to Corral Hollow Creek. The agreement was effective from December 8, 1994, through October 1, 1995.

Inspections

CDFG personnel visited the Livermore site on March 28, 1995, to determine the need for streambed alteration agreements for three projects: (1) utility access road repair work impacting Arroyo Mocho, (2) repair of the Patterson Pass bridge abutment and nearby bank at Arroyo Las Positas, and (3) emergency work in Arroyo Seco. As a result of this visit, the CDFG warden requested that LLNL obtain a streambed alteration agreement for the access road repairs, the warden verbally approved the Arroyo Seco emergency work, provided that an application for an alteration agreement will be filed after the work is completed, and decided that the bridge abutment maintenance did not require an agreement. On June 15, 1995, CDFG personnel inspected the sites of the proposed utility access road repair near Arroyo Mocho and the culvert removal and outfall repairs in Arroyo Las Positas.

CDFG personnel visited the Livermore site on April 12, 1995, to provide guidance on three projects in or near streambeds: debris removal from the Arroyo Seco; North Buffer Zone Channel repairs; and the crossing of Arroyo Mocho to the LLNL Mocho pumping station. The warden agreed with the proposals for the work and asked LLNL to submit an application for a Streambed Alteration Agreement.

CDFG personnel visited Site 300 on May 18, 1995, to determine the need for a streambed alteration agreement for work proposed in the 832 Canyon. CDFG indicated a streambed alteration agreement would be required for the work. The agreement application will be submitted in 1996.

CDFG personnel visited the Livermore site on August 22, 1995, to provide guidance for culvert removal and erosion repair, construction of the Decon-

tamination and Waste Treatment Facility (DWTF) outfall structure, and removal of four culverts near Hertz Hall (Building 661). Different designs for rip-rap at the DWTF outfall were discussed. The warden agreed with LLNL proposals for the work, and suggested that the riprap at DWTF be extended further along the banks to prevent erosion.

No violations were reported by CDGF during these visits.

Nationwide Permits

LLNL notified the Army Corps of Engineers and obtained a waiver of water quality certification from the San Francisco Bay RWQCB for one project discharging dredge or fill materials into navigable waters. On August 11, 1995, LLNL submitted a courtesy notification to the Army Corps of Engineers for maintenance and repair work in Arroyo Las Positas that was considered permitted under Army Corps of Engineers Nationwide Permit (33 CFR, Part 330), pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the River and Harbors Act of 1899 (33 U.S.C. 403). The provisions of the Nationwide Permit require the project proponent to obtain a Clean Water Act Section 401 water quality certification stating that the project will not violate state water quality standards. On August 9, 1995, LLNL submitted a request for a waiver of Water Quality Certification to the San Francisco Bay RWQCB. The San Francisco Bay RWQCB issued the waiver of the Water Quality Certification on September 19, 1995. No action was required of the Army Corps of Engineers.

Inspections

No inspections were conducted in 1995 by the Army Corps of Engineers.

Injection Wells

In 1995, LLNL registered with EPA for the first time 32 active and 20 inactive Class V injection wells at Site 300. The majority of the active injection wells are septic systems and percolation pits receiving small volumes of process waste, such as boiler blowdown and cooling tower blowdown.

Inspections

No inspections were conducted by EPA in 1995.

Building Drain Repair Project

In 1995, LLNL completed the $2.1 million Building Drain Repair (BDR) project. This project was charged with performing sitewide repairs identified by the Building Drain Investigation Project and prepared necessary documentation to

bring LLNL and Site 300 in compliance with the NPDES Storm Water requirements imposed by the RWQCBs in 1991. Drains discharging to improper destinations were removed or redirected in accordance with currently mandated regulatory requirements. If the discharge was not redirected or removed, it was permitted under provisions mandated by storm water regulatory requirements. Nearly 600 actions were performed at the Livermore site (320 repairs, 196 floor drains stenciled) and Site 300 (77 repairs).

Permit and repair work for the Livermore sitewide storm water permit was approved by the San Francisco Bay RWQCB on August 25, 1995, ahead of the regulatory deadline maintaining regulatory compliance for the site. All requested documentation was submitted and identified repair work was completed by December 22, 1995, maintaining Site 300 regulatory compliance. This work is being driven by the Porter-Cologne Water Quality Control Act and NPDES Stormwater Requirements for Industrial Facilities. Building drain management of over 25,000 drain sources and destinations has now become the responsibility of Plant Engineering's Technical Support Group. All future drain additions and modifications are being tracked with a drain permit system as an infrastructure management function. Environmental drain discharge guidance support will continue to be the responsibility of the Environmental Protection Department.

The BDR project was also responsible for developing guidance and support documentation to aid in future training and facility support. A major cultural shift in peoples' thinking and heightened awareness of cumulative impacts of water-related discharges to ground resulted from project interactions with program staff. The sitewide storm water map for the Livermore facility was updated to better depict storm water infrastructure.

Sanitary Sewer Rehabilitation Project

The $5 million Sanitary Sewer Rehabilitation project was completed in 1995. This project was charged with performing sitewide sewer infrastructure repair activities identified by a 1989 Conceptual Design Report. This report and subsequent closed circuit TV work identified sanitary sewer line deficiencies by a point rating score allowing prioritization of lining, point repair, and manhole rehabilitation activities. This resulted in an 88% reduction in infiltration and improper inflow to the sanitary sewer.

Specifically, this project lined 7300 linear meters of pipe and completed 130 point repairs throughout the facility. Forty-two laterals and 150 cleanouts were installed to allow better access to the sanitary sewer system. Ten new manholes were installed and 50 manholes were lined with fosrock to prevent leakage. The sitewide sanitary sewer map for the Livermore facility was updated to reflect rehabilitated sanitary sewer infrastructure.

Tank Management

LLNL manages its tanks, underground storage tanks (USTs), and aboveground storage tanks (ASTs) through the use of underground tank permits, tank integrity testing, monitoring plans, operational plans, closure and leak documentation, the Tank Upgrade Project, remedial activities, and inspections. Those topics are discussed in the following sections.

Underground Tank Permits

Underground tanks contain diesel fuel, gasoline, waste oil, and potentially contaminated wastewater; aboveground tanks contain diesel fuel, insulating oil, TCE, and contaminated wastewater. Some of the wastewater systems are a combination of underground storage tanks and aboveground storage tanks. **Table 2-4** tabulates tank status as of December 31, 1995.

Table 2-4. Status of in-service tanks, December 31, 1995.

Tank type	Livermore site			Site 300		
	Permitted	No permits required	Total	Permitted	No permits required	Total
Underground storage tanks						
Diesel fuel	8	0	8	4	0	4
Gasoline	2	0	2	1	0	1
Waste oil	1	0	1	0	0	0
Wastewater	5	37	42	0	10	10
Subtotal	**16**	**37**	**53**	**5**	**10**	**15**
Aboveground storage tanks						
Diesel fuel	0	27	27	0	12	12
Product	0	13	13	0	4	4
Wastewater	7[(a)]	87	94	0	15	15
Subtotal	**7**	**127**	**134**	**0**	**31**	**31**
TOTAL	**23**	**164**	**187**	**5**	**41**	**46**

[a] These seven tanks are situated at the LLNL Treatment, Storage, and Disposal Facility and are operated under interim status as part of the RCRA Part B permit application.

As a point of clarification, radioactive wastewater tanks are included in the wastewater tanks category. Radioactive wastewater is aqueous waste that contains radionuclides with gross alpha, gross beta, gamma, or tritium levels that are at or above the radiological limits specified in DOE Order No. 5400.5 *Radiation Protection of the Public and the Environment.* Wastewater that contains radionuclides below those specified above can be labeled and managed as radioactive by the programs as a best management practice.

The number of USTs requiring tank operating permit fees during all or part of 1995 at the Livermore site decreased by 10, from 28 in 1994 to 18 in 1995. The 18 tanks for which fees were paid consisted of 8 diesel, 1 waste oil, 2 gasoline and 7 wastewater retention USTs. The 16 permitted USTs noted in **Table 2-4** do not include 2 wastewater retention tanks with which we began the closure process in 1995.

At the end of 1995, Site 300 had a total of five underground petroleum product tanks in service: four diesel storage tanks and one gasoline storage tank. No diesel USTs were closed in 1995. Fees were paid for five tanks during 1995 as noted in **Table 2-4**.

Tank Integrity Testing

Under the tank leak-tightness testing program, single-walled hazardous waste and hazardous product USTs are tested to determine structural integrity in accordance with requirements established in state and federal regulations. The underground portions of tank systems are tested (as a whole or by component parts) using methods that may include precision tests, dye tests, helium-injection detection, and hydrostatic tests. All leak-tightness test results for regulated systems are provided to Alameda County Environmental Health Services or San Joaquin County Public Health Services.

Two diesel USTs and five wastewater retention USTs at the Livermore site and three wastewater retention USTs at Site 300 were tested in 1995 as part of the state and federal requirements for annual testing of single-walled USTs. The new replacement gasoline UST at Site 300 was not tested in 1995 because it is double-walled with continuous leak detection, as are the four diesel USTs.

Closure and Leak Documentation

Closure requirements for hazardous USTs include the preparation and approval of a closure plan for the system, quarterly reports if leaks have been identified, and a report upon completion of closure activities. The closure plans must include a detailed review of the uses of the tank, a sampling plan, a site plan, and other information to verify that no environmental contamination has occurred or, if it has occurred, to ensure its cleanup. Hazardous waste ASTs must also meet regulatory requirements for closure plans, field activities, and closure reports.

A total of 22 closure plans were prepared in 1995 for tank systems (or portions of systems) that were taken out of service, previously removed (but not officially closed), or expected to be removed from service. Four of these closure plans were for regulated hazardous product, hazardous waste, or mixed waste USTs and were submitted to regulatory agencies. (A mixed waste UST stores waste that has the characteristics of both hazardous and radioactive waste.) One closure plan has been approved; the other three are pending approval. The 18 remaining closure

plans were prepared for aboveground hazardous and nonhazardous waste tank systems as a part of LLNL's best management practices. Thirteen of these were approved, and the five remaining are awaiting approval.

Upon completion of closure activities, closure reports for hazardous product, hazardous waste, and mixed waste USTs must be submitted to the regulatory agencies for review and approval. Two closure reports for hazardous product USTs were submitted to regulatory agencies for review in 1995. Both are awaiting approval in 1996. Three additional closure reports were in final review at year end and will be forwarded to regulatory agencies upon completion. Seven closure reports were prepared in 1995 for aboveground hazardous product tanks, two of which were approved as a part of LLNL's best management practices.

In 1995, LLNL submitted unauthorized release (leak)/contamination site reports to the regulatory agencies for three regulated UST systems. All leaks occurred at the Livermore site. Unauthorized release/contamination from a diesel UST was discovered based on soil sample results taken during tank closure. The results indicated diesel contamination. One unauthorized release report was initiated during the removal of a wastewater retention tank system's piping. The third release was identified when contamination was discovered in a soil sample taken from beneath a wastewater retention tank that is in the process of being closed.

Tank Upgrade Project

In fiscal year 1992, LLNL received funding for 4 years to upgrade or close approximately 126 tanks in accordance with existing local, state, and federal tank regulations or to decrease the potential for environmental contamination as the result of a release from a tank or its appurtenances. These tanks include wastewater retention tanks (for nonhazardous, hazardous, mixed, and radioactive waste) and product retention tanks (for petroleum products). In fiscal year 1993, additional funding was granted to provide overflow and spill protection to aboveground oil-filled electrical equipment (e.g., transformers) and additional aboveground petroleum tanks, resulting in a revised total of 214 tanks or transformers being closed or upgraded. In fiscal years 1994 and 1995, the remaining nonhazardous tank systems were dropped from the overall scope, reducing the number of tanks and transformers to 158. As of December 1995, construction was completed for 116 tanks, construction is in progress for 27 tanks, design was completed for 146 tanks, and design is in progress for 12 tanks.

Remedial Activities

Previous Environmental Reports have discussed the leakage of tritiated rinse water from a UST into the Building 292 area subsurface. In 1995, approval was received from the Alameda County regulatory agency to seal the UST in place with concrete. The UST was filled with concrete and the ends of the piping were

sealed on September 6, 1995, and the nearby piezometer UP-292-001 was pressure grouted and sealed in place on September 25, 1995.

The data collected for the Building 292 Area have been incorporated into a vadose-zone computer model to provide estimates of tritiated moisture movement within the subsurface. The model has been verified with experimental results, and work is in progress to assign values to locations where there are no measured data.

Inspections

For every installation and closure of hazardous waste, mixed waste, and hazardous product USTs, there is an inspection in which a representative from Alameda County Environmental Health Services (for the Livermore site) or San Joaquin County Public Health Services (for Site 300) participates. For 1995 there were 13 inspections by the former and no inspections by the latter. No NOVs or notices of deficiency were received as a result of any of these inspections.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) provides the framework at the federal level for regulating the generation and management of solid wastes, including wastes designated as hazardous. Similarly, the California Hazardous Waste Control Act (HWCA) sets requirements for managing hazardous wastes in California. RCRA and HWCA also regulate hazardous waste treatment, storage, and disposal facilities, including permit requirements.

Because RCRA program authorization was delegated to the State of California in 1992, LLNL now works solely with the Department of Toxic Substances Control (DTSC) on compliance issues and in obtaining hazardous waste permits.

Hazardous Waste Permits

The Livermore site hazardous waste storage and treatment management units continued to operate under interim status provisions (ISD CA2890012584) while DTSC continued to review and consider the LLNL Part B permit application. Waste management units include container storage, tank storage, and various treatment processes (e.g., wastewater filtration, blending, and size reduction). LLNL also submitted a revised Health Risk Assessment in November 1995 in support of this permitting action.

Work also began in 1995 on the development of a Part B permit application supplement for the Decontamination and Waste Treatment Facility (DWTF), construction of which is slated to begin in September 1997. The DWTF will be constructed in order to consolidate, replace, upgrade, and augment existing LLNL waste management capabilities. In order to become more familiar with

LLNL operations, permitting staff from DTSC visited the Livermore site on March 28, 1996, and toured existing waste management facilities as well as the proposed location of DWTF. The permit application effort will culminate with a submittal to DTSC in June 1996 with an anticipated permit issuance in August 1997.

The Site 300 Building 883 hazardous waste container storage area (CSA) continues to operate under the provisions of the Part B permit (Part B CA28990090002) issued by EPA and DTSC in November 1989, while DTSC considers renewal of the permit. LLNL provided additional information to DTSC in August 1995 to supplement the permit application. Permit renewal is anticipated in early summer of 1996.

Two new facilities were proposed for Site 300, and Part B permit applications were submitted for each facility. Additional information was provided to DTSC in September 1995 to supplement the permit applications. The Explosives Waste Storage Facility (EWSF) augments the storage capability at the Building 883 CSA by providing a separate dedicated facility to store explosives waste. The draft permit for both the EWSF and Building 883 were completed and, if no major issues are identified, should be issued by DTSC as final in early summer of 1996. The other facility is a new open burning/open detonation facility called the Explosives Waste Treatment Facility, EWTF) that will replace the existing Building 829 Open Burn Facility. The Building 829 Open Burn Facility for explosives waste continues to operate under an enforcement order received from DTSC in September 1993. LLNL anticipates issuance of the EWTF permit in fiscal year 1997.

Extremely Hazardous Waste Permit

Permit No. 2-13640 is required, pursuant to 22 CCR 67430.1, to transport extremely hazardous waste to an off-site hazardous waste disposal facility. As a condition of the permit, LLNL must prepare a list of extremely hazardous wastes (including concentration, quantity, packaging, proposed hauler, disposal facility, and proposed method of disposal) and submit it to DTSC two weeks before shipping any such waste. This permit must be renewed annually; the application for renewal was submitted in August 1995.

Inspections of Hazardous Waste Management Facilities

On April 26, 27, and May 9, 1995, Department of Toxic Substances Control (DTSC) Region 2 conducted a Compliance Evaluation Inspection at the Livermore site. The following locations were inspected: four of the five Hazardous Waste Management (HWM) facilities (Areas 612, 514, 233, and 693), five Waste Accumulation Areas (WAAs), 18 workplace accumulation areas (WPAAs), Buildings 141 and 113 aboveground hazardous waste storage tanks, and two conditionally exempt (CE) resin-mixing units. Also on May 9, 1995,

DTSC reviewed the following types of records: inspection logs, hazardous waste manifests, land disposal restriction notifications, annual (facility) reports, stored waste inventory, hazardous waste hauling licenses, interim status documents, hazardous waste facility operating logs, conditionally exempt treatment unit operating logs, contingency plans, and training records.

On May 9, 1995, DTSC held an on-site close-out meeting and delivered a Field Report of Violation identifying no violations and two Tiered Permitting Verification Inspection Reports also identifying no violations. (Although one observation was made during the 3 days of inspection, it was immediately corrected and no violations were cited.) A formal written report of the inspection was issued to LLNL on May 26, 1995.

On November 8 and 9, 1995, DTSC conducted a Compliance Evaluation Inspection of the Site 300 hazardous waste facilities. The following locations were inspected: Building 829 (Existing Open Burn Area), M-3 Waste Accumulation Area (WAA), Building 845 (Proposed Explosives Waste Treatment Facility [EWTF]), RCRA landfill pits 1 and 7, Building 819, Building 883 (Container Storage Area), Building 875 (Maintenance Shop Area and associated WAA), and Building 879 (Motor Pool Area). The following types of records were reviewed: inspections of the Building 883 Container Storage Area and WAAs, hazardous waste manifests, land disposal restriction notifications, contingency and emergency plans, and training records. No violations were noted during the inspection.

Hazardous Waste Reports for 1994 and 1995

Hazardous Waste Management's (HWM's) annual *Hazardous Waste Report—Mainsite* and *Hazardous Waste Report—Site 300* are required under 22 CCR 66264.75. These reports were completed and delivered to EPA on May 30, 1995, by the adjusted deadline. HWM's corresponding biennial reports, which cover 1994 waste-handling information, were completed and submitted to meet DTSC's adjusted April 1, 1995, deadline. The biennial reports are required under 40 CFR 262.41, 264.75, and 265.752.

Both the annual and biennial reports are maintained on file at LLNL and comprise four forms. The Identification and Certification form provides general facility information, including addresses, contacts, and general waste minimization information. The Generation and Management form includes "cradle-to-grave" tracking of each waste stream category. The Waste Received form includes descriptions and quantities of wastes that were received from off-site facilities (Site 300 and the Livermore Airport), and the Process System form includes waste quantities treated by each waste management unit on site.

Hazardous Waste Transport Registration

This registration is required, pursuant to 22 CCR 66263.10, to transport hazardous wastes over public roads (e.g., from one LLNL site to another). Conditions for registration include annual inspections of transport vehicles and trailers by the California Highway Patrol, special training and annual physical examinations for drivers, and annual submission of lists of transport vehicles and trailers to DTSC. The registration was renewed by DTSC in November 1995.

Waste Accumulation Areas

Beginning in January 1995, there were 44 Waste Accumulation Areas (WAAs) at the Livermore site and one WAA at the Livermore Airport. During the year, four WAAs were taken out of service and one WAA was put in service, leaving a total of 41 WAAs at the Livermore site and one WAA at the Livermore Airport. Program representatives conducted inspections at least weekly at all WAAs to ensure that WAAs were operated in compliance with regulatory requirements. In addition, Environmental Protection Department (EPD) personnel conducted biweekly, routine checks at all WAAs to help ensure that programs managed their WAAs and wastes in compliance with state and federal requirements. EPD personnel performed 828 biweekly WAA walkthroughs at the Livermore site and 21 biweekly WAA walkthroughs at the Livermore Airport during 1995. More than 2200 formal WAA inspections were conducted at the Livermore site and 52 at the Livermore Airport WAA. The EPD walkthroughs are informal checks of items such as capacity, labeling, and secondary containment. Formal inspections of these items are conducted by program personnel.

Beginning in January 1995 there were eight WAAs at Site 300. During the year, six WAAs were taken out of service, leaving two WAAs at Site 300. EPD personnel performed 112 biweekly WAA walkthroughs at Site 300 during 1995.

Medical Waste Permit

LLNL generates several types of medical wastes (previously identified as infectious wastes). In July 1991, LLNL registered with the Alameda County Environmental Health Services as a large-quantity generator of medical waste and submitted an application for a medical waste treatment permit for the Livermore site. Site 300 is a small-quantity generator and is therefore exempt from medical waste registration.

The Livermore generator registration and treatment application contained detailed information concerning the management and treatment of medical wastes generated by LLNL's biomedical research, Center for Chemical Forensics, and health services facilities. The registration for medical waste generation is issued annually and is currently valid through July 1996. The treatment permit for steam sterilization at the biomedical facilities was issued in August 1991 and is valid through July 1996.

Inspections

The Alameda County Department of Environmental Health conducted an inspection of LLNL's medical waste generator and treatment facilities at the Livermore site on August 29, 1995. No violations were noted at any of the facilities.

Building Inspections

Formal, detailed building inspections for each LLNL facility are conducted based on a schedule established by the Facility Manager and the appropriate Environmental, Safety and Health (ES&H) Team. The ES&H Teams are made up of environmental, safety, and health discipline specialists who assist LLNL to maintain compliance with ES&H requirements.

The inspections scrutinize handling and management of hazardous and radioactive wastes and waste streams, management and maintenance of WAAs, potential release pathways to the environment (e.g., storm and sanitary sewer drains, air), hazardous product storage areas, wastewater retention tank systems, operating equipment (e.g., vacuum pumps, transformers, capacitors, and baghouses), and laboratory and machine shop areas. An inspection report is prepared for a program or department, and follow-up checks are conducted to ensure implementation of recommendations or corrections. Walkthrough inspections are conducted on an as-needed basis. During 1995, the ES&H teams conducted 211 formal building inspections at the Livermore site. At Site 300, the team conducted 15 formal building inspections. Building inspections include buildings, trailers, and tents. EPD conducted 11 audits of the HWM facilities at the Livermore site and 11 audits of the HWM facilities at Site 300.

Site Evaluations Prior to Construction

Soil and debris from construction sites are evaluated for reuse and disposal. Rubble may be surveyed for radioactivity or analyzed, depending on the outcome of the evaluation. The soil is sampled and analyzed for potential radioactive or hazardous contamination. Soil is reused when possible (depending on analytical results) or disposed of according to established procedures. During 1995, environmental analysts conducted preconstruction site evaluations for 85 construction projects.

Toxic Substances Control Act

The management of polychlorinated biphenyls (PCBs) and asbestos waste are regulated under the Toxic Substances Control Act (TSCA). At LLNL, equipment containing PCBs is used in a totally enclosed manner until the equipment is taken out of service, at which time it is removed to HWM for disposal at an approved site. LLNL also conducts research and development activities using PCBs. Statistics for PCBs compiled in 1995 are kept on file, available for EPA

inspection. The PCB annual report, required under 40 CFR 761.180, is a record of PCB-containing equipment in service, taken out of service, or disposed of during the year. The State of California has also enacted regulatory requirements for PCBs and asbestos wastes. These wastes are reported in the Hazardous Waste Report, which is required by DTSC under 22 CCR 66264.75.

Inspections of Toxic Substances Control Act Facilities

On April 6, 1995, DTSC, on behalf of EPA Region IX, conducted a Toxic Substances Control Act (TSCA) inspection specifically for activities associated with polychlorinated biphenyls (PCBs) covered under 40 CFR 761. The following areas were visited during the inspection: B-517 (High Voltage Group), Building 194 (PCB transformer), Building 365 (BBRP Research and Development Activities, Building 222 (analytical laboratories), Building 625 (PCB storage facility), and Building 693 (PCB storage facility). The following types of records were reviewed: transformer inspection records, storage facility records and inventories, and several annual reports. No violations were determined as a result of this inspection. However, the September 5, 1995, report noted as a potential deficiency that "mixed" PCB containers had been stored for more than one year from their removal from service. The inspector also acknowledged that "there is extremely limited or nearly nonexistent disposal and treatment options" for this type of waste. DOE is working with the EPA and the U.S. Naval Nuclear Propulsion Program to develop a National Federal Facility Compliance Agreement to address this issue. LLNL will comply with the terms of this agreement once it is completed and issued.

National Environmental Policy Act

The National Environmental Policy Act (NEPA—42 U.S.C. 4321 et seq.) established federal policy for protecting environmental quality. The major method for Environmental Impact Statement (EIS) for any major federal or federally funded project that may have significant impact on the quality of the human environment. If the need for an EIS is not clear, or if the project does not meet DOE's criteria for requiring an EIS, an Environmental Assessment (EA) is prepared. A Finding of No Significant Impact is issued when the EIS is determined to be unnecessary.

Certain groups of actions that do not have a significant effect on the environment either individually or cumulatively can be categorically excluded from more in-depth NEPA review (i.e., preparation of either an EA or EIS). DOE NEPA implementing procedures (57FR15122) identify those categorical exclusions and the eligibility criteria for their application. If a proposed project does not clearly fit one of the exclusion categories, a DOE Action Description Memorandum is prepared to determine which type of assessment document may be needed.

Environmental Assessments/ Analyses Submitted to DOE

In 1995, LLNL prepared 19 categorical exclusion documents for DOE review to comply with NEPA. DOE issued one Finding of No Significant Impact in 1995 for the EA on the Mixed Waste Management Facility (MWMF), submitted earlier for DOE determination. Three draft EAs for proposed projects were submitted to DOE in 1995 for NEPA review and determination.

The 1995 *Draft Project-Specific Analysis for the Contained Firing Facility (CFF)* addressed the potential impacts from construction and operation of a facility that would contain the products of combustion from the testing of explosives at LLNL's Experimental Test Facility at Site 300. DOE is currently reviewing this draft analysis as an appendix to the 1996 *Draft Programmatic EIS for Stockpile Stewardship and Management (*SSM PEIS).

The 1995 *Draft Environmental Assessment for the Decontamination and Waste Treatment Facility* addressed the potential impacts of constructing and operating up-to-date replacement hazardous waste management facilities for handling, storing, disposing of, and treating hazardous, radioactive, and mixed wastes at the Livermore site. DOE is currently reviewing this draft and consolidating public review comments.

In addition, a draft project-specific analysis pertaining to the proposed National Ignition Facility (NIF) was prepared in 1995 by Argonne National Laboratory. Argonne's report addressed the potential impacts of constructing and operating the NIF. The NIF's goal is to achieve fusion ignition in the laboratory for the first time by using inertial confinement fusion (ICF) technology. DOE is currently reviewing this analysis as an appendix to the 1996 *Draft Programmatic EIS for Stockpile Stewardship and Management* (SSM PEIS).

Floodplain Management and Wetland Protection

Executive Orders 11988 (*Floodplain Management)* and 11990 (*Protection of Wetlands*), both dated May 24, 1977, require each federal agency to issue or amend existing procedures to ensure that the agency evaluates the potential effects of any action it may take in a floodplain (Order 11988) and to consider wetland protection in its decision making (Order 11990). DOE's Regulation (10 CFR 1022) outlines procedures for implementing these Executive Orders and states its policy that it should be implemented through existing NEPA review procedures when possible. LLNL applies the requirements of the DOE wetlands/floodplains policy and procedures through the NEPA review process for each proposed LLNL action. In accordance with DOE regulation, a separate public notice and floodplain/wetlands assessment may be required for certain proposed actions and would be prepared if no EA- or EIS-level NEPA documentation incorporating such assessments had been prepared. In 1995, there were no proposed LLNL actions that required such separate DOE assessments.

2. Compliance Summary

California Environmental Quality Act

The California Environmental Quality Act (CEQA—California Public Resources Code Sections 21000 et seq.) establishes state policy for protecting environmental quality. The goals of CEQA are achieved by requiring local and state governmental and quasi-governmental agencies to assess the potential environmental impacts of proposed actions for which they may have a decision-making role. This is done through the preparation of an Initial Study (IS), which leads to issuance of a Negative Declaration or a requirement to prepare an Environmental Impact Report (EIR). An EIR may also be prepared directly for projects that may have significant environmental impacts. Exemptions from needing to prepare an IS or EIR are available for certain categories of non-impacting activities.

Initial Studies and Environmental Impact Reports

No Initial Study or EIR documents were prepared by the University of California (UC) in 1995 on proposed projects for which the UC was the decision-making or lead agency.

Mitigation Measures

In November 1992, UC and LLNL made a commitment to implement 67 mitigation measures identified by the 1992 EIS/EIR Environmental Impact Statement and Environmental Impact Report for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore (U.S. Department of Energy and University of California 1992a,b) and to provide annual reports on their implementation. The measures are being implemented in accordance with the approved 1992 Mitigation Monitoring and Reporting Program. The fiscal year 1994 annual report is dated December 1995; the next annual report will cover fiscal year 1995 activities.

Endangered Species Acts and Sensitive Natural Resources

LLNL must meet the requirements of both the U.S. Endangered Species Act and the California Endangered Species Act as they pertain to endangered or threatened species and other species of special concern that may exist or are known to exist at the LLNL sites. For example, in implementing the Mitigation Monitoring and Reporting Program in 1995, biological assessment surveys were performed for special-status species at 32 LLNL project construction (ground disturbance) areas. Presence data for the San Joaquin kit fox (*Vulpes macrotis mutica*), American badger (*Taxidea taxus*), and burrowing owl (*Speotyto cunicularia*) were collected at each project location, and other applicable mitigation measures were implemented when required.

During 1995, no active San Joaquin kit fox dens were discovered, but three potential dens were found. Twelve occupied American badger dens were discovered, and two unoccupied dens were identified. Ten active burrowing owl dens were discovered (six at the Livermore site and four at Site 300), and two potential dens were identified. In addition, one new blue elderberry bush (*Sambucus caerula*) location was delineated at Site 300. One special-status animal

species, not previously known to occur on LLNL property, was observed in 1995: the Western spadefoot toad (*Scaphiopus hammondii)* was observed at Site 300.

In the fall of 1992, LLNL investigators began a project to establish new experimental populations of the large-flowered fiddleneck (*Amsinckia grandiflora*), a federally listed endangered plant species, into a portion of its designated critical habitat at Site 300. The investigators are also studying the causes of the species decline. This work was funded through 1995 by a Laboratory Directed Research and Development grant and is being conducted in collaboration with Mills College, representing the California Department of Fish and Game (CDFG), and UC Davis, with the approval of the U.S. Fish and Wildlife Service.

Researchers from Mills College and UC Davis made numerous trips to Site 300 between October 1994 and May 1995 to work with LLNL personnel on both the experimental and natural populations. The natural populations are located adjacent to the Building 858 Drop Tower (known as the Drop Tower population), and at a site one canyon to the west, which is known as the Draney Canyon population. The experimental populations are located near the Drop Tower natural population. On April 14, 1995, LLNL personnel counted 1114 mature plants in the Drop Tower population. Although this was down from the 1606 plants observed in 1994, it remains a robust population. On April 25, 1995, LLNL personnel counted 27 mature plants in the Draney Canyon population, up from the 16 plants counted in 1994. The census information was provided to the CDFG.

In 1992, artificial seeding was conducted at two locations. In 1993, one of the locations showed promise in sustaining an experimental population, therefore, all subsequent work focused on this location. In 1994, the experimental population at this location had a total of 248 mature plants as a result of additional seeding and transplantation. These plants were allowed to senesce naturally. On April 21, 1995, this population contained 403 naturally established mature plants. This experimental population has apparently successfully established itself and will be counted and managed with the existing two natural populations.

National Historic Preservation Act

The National Historic Preservation Act (NHPA), as amended through 1992, contains two primary sections that apply to federally operated and funded installations such as LLNL: Sections 110 and 106. Section 110 sets forth the broad affirmative responsibilities for balancing agency missions with cultural values. Its purpose is to ensure that historic preservation is fully integrated into federal agency programs. Section 106 (36 CFR 800) requires federal agencies to take into account the effects their projects may have on “historic properties” (cultural resources), and they must allow a reasonable time period for the Advisory Council on Historic Preservation (the Council) to comment.

Consultation with a variety of agencies and interested parties continued or was initiated in 1995. Building on the consultation process begun in 1994, representatives of the State Historic Preservation Office (SHPO) visited LLNL. After touring some of the archaeological sites at Site 300, discussion focused on possible unique resources at LLNL and methods for resolving both long- and short-term cultural resource compliance issues. In addition, LLNL submitted a draft Programmatic Agreement to the DOE/OAK field office to forward to the SHPO and the Council for comment prior to signing an approved agreement. Native American consultation was initiated with a request for input to the development of a discovery plan to help implement the NHPA, as well as the American Indian Religious Freedom Act, the Native American Graves and Repatriation Act, and the Archaeological Resources Protection Act. Letters were sent to representatives of 12 local Native American groups and tribes identified by the state of California Native American Heritage Commission.

While awaiting finalization of the Programmatic Agreement, policies and procedures for conducting cultural resource management reviews and surveys of proposed projects in accordance with federal and state standards continue to be formalized and instituted into the framework of LLNL program activities.

LLNL participated in the following activities and initiatives in 1995:

- We undertook a major archaeological field survey for the Annual Site 300 Fire Trail Grading Project, which involved surveying approximately 160 km of fire trails at Site 300. Four previously unrecorded isolated historic cultural resources were located. An unrecorded and previously unidentified length of historic telegraph/electric pole was found but is not within the project boundaries. One previously identified site, the residential portion of the Carnegie archaeological site, was found to be within the boundaries of the project. This site will be protected from further impacts while it is undergoing the NHPA Section 106 process. The process will determine the site's eligibility to be listed on the National Register of Historic Places and what effects and impacts, if any, the project has on the resource. If adverse impacts are identified, then appropriate mitigation measures will be determined in consultation with all interested parties.
- Mapping of the residential portion of the Carnegie archaeological site was completed.
- We began installing permanent, surveyed markers for each recorded archaeological site at Site 300. This will not only allow more accurate mapping but will provide higher visibility for site locations to help promote site protection and preservation.

- Seventeen public presentations were performed (as wells as numerous tours and open houses) on the unique cultural resources found at LLNL.
- An oral interview was conducted with a former resident of the Corral Hollow Canyon, where Site 300 and the Carnegie archaeological site are located.

Department of Energy Tiger Team and Tiger Team Progress Assessment

DOE conducted a Tiger Team Assessment of LLNL environmental, safety, and health (ES&H) programs in 1990, and a followup Tiger Team progress assessment in November 1992. In July 1993, LLNL submitted a Draft Action Plan to DOE in response to this assessment. The 58 subtasks covering 24 Areas of Need in this Action Plan were incorporated as an addendum to the original Tiger Team Action Plan.

In 1995, LLNL made significant progress towards completing the 581 subtasks identified in its original seven-year Tiger Team Action Plan. Action items were prioritized and funded within budget constraints. As of December 31, 1995, 91% of these subtasks had been completed, about 1% are on schedule for completion, and 2% are considered late; 33 of the subtasks (the remaining 6%) are not funded or have been canceled because the remaining portion has a low priority based on its cost-to-benefit ratio or because of changes in standards or operations. Of the 58 subtasks in the Progress Assessment Area of Needs, 43 (74%) are complete, 10 are expected to be completed, and 5 will be canceled with no further action. At the end of 1995, LLNL closed the Tiger Team Project Office.

Agreement in Principle Program Activities

DOE established an Agreement in Principle (AIP) Program with the State of California in 1991 to improve openness and information transfer regarding environmental monitoring and impacts at DOE-operated sites in California. Two State agencies were responsible for implementing the State's program; the Department of Health Services had primary responsibility, but delegated to the State Water Resources Control Board responsibility for activities that addressed water resources. During 1995, LLNL cooperated with the State in a colocated direct radiation monitoring program using thermoluminescent dosimeters (TLDs) (see Chapter 12 for a description of LLNL's direct radiation program) and with discussions and data review regarding water monitoring at LLNL's Site 300. In addition, special efforts were initiated by DOE, LLNL, and the State to develop a greater sense of teamwork among all participants of the AIP Program. In late 1995, LLNL was notified that DOE would no longer be funding the California AIP Program. However, we have agreed with the Department of Health Services to maintain the program of colocated TLDs.

Current Issues and Actions

Many current issues and actions are described in this report according to chapter subjects. This section lists several not covered elsewhere.

Miniature Optical Lair Explorer

In the spring of 1994, Operations and Regulatory Affairs Division (ORAD) developed and began using the Miniature Optical Lair Explorer (MOLE) to perform biological assessment studies at Site 300. The MOLE is a miniature tracked vehicle with a tiny camera that allows scientists to investigate subterranean tunnel systems of special-status wildlife species to determine the presence and number of individuals. At LLNL, the San Joaquin kit fox, burrowing owl, and American badger receive special consideration during ground-disturbing activities in order to ensure their protection, if present.

The MOLE was used successfully both on and away from the LLNL site during the 1995 assessment season. The most significant results were obtained on a research trip to a Department of Interior resource conservation area in Idaho. During the trip 22 burrowing owl dens were examined, and the eggs, young, and adults were videotaped in their dens. Numerous other ecological findings accompanied these discoveries, such as the average tunnel length to the nest, underground prey stockpiling for the young, and passive receptivity by the owls to the MOLE vehicle.

MOLE improvements for 1995 included a lowered profile, high-output light emitting diodes (LEDs) for illumination, and a longer tether for more remote viewing of den systems. Use of the MOLE will continue in 1996, and further development of this versatile tool is planned.

Meteorological Tower Upgrades

In response to recent Bay Area Air Quality Management District (BAAQMD) recommendations to monitor meteorological conditions with greater sensitivity, LLNL installed a new set of sensors at the Livermore site during October 1995. The new wind speed and direction sensors respond to much lower wind speeds, which frequently occur at LLNL. The temperature sensors are now housed in fan-aspirated solar shields to more accurately measure temperature when the winds are low. On February 1, 1996, after running the old and new sensors side-by-side for comparative purposes, meteorological monitoring for the site was changed to the new sensors.

10 CFR 834 Proposed Rule

Under the Price Anderson Amendment Acts, 10 CFR 834 is a proposed rule governing radiation protection of the public and the environment. This rule would codify certain aspects of existing DOE orders. LLNL has provided review and comment on many aspects of this proposed regulation. In 1995, guidance for

preparation of the Environmental Radiological Protection Plan required by the rule was drafted by a DOE committee. LLNL provided comments on each version of the guidance that was made available. The proposed rule is expected to be finalized in late-1996.

Necessary and Sufficient Standards

The Necessary and Sufficient Set of Standards Closure Process was developed by the Department Standards Committee of DOE to provide a mechanism for DOE to move to standards-based operations. The Committee commissioned pilot demonstrations to be carried out at selected DOE sites, of which LLNL was one. The scope of the pilot demonstration at LLNL concerned the radiological waste management activities, including low-level waste, transuranic waste, and the radiological component of these types of mixed waste. This scope was chosen to exercise the process on a complex activity at a multiprogrammatic site. The pilot demonstration did not include consideration of the hazardous component of mixed waste; the design and construction of facilities; or institutional activities that are performed at LLNL's Hazardous Waste Management facility on radioactive waste (such as security, radioactive materials accounting and management, emergency response, on-site transportation of waste, and fire safety). Work in these areas where the process was not applied will be done to the existing institutional standards and procedures.

The goals of the pilot demonstration were to consolidate radioactive waste management activities at LLNL under a set of standards that controls risk to workers, the public, and the environment at or below industry accepted levels; reduces costs; increases productivity; and maintains public confidence and protection.

The work of managing radioactive waste was assessed to determine the associated hazards, relative to the safety of the worker, the public, and the environment. The assessment was performed by operational and subject matter experts from the University of California and DOE who work at LLNL. The pilot demonstration members applied their individual and collective judgment and expertise and, working together and with the approval authorities, chose the set of standards and implementing assumptions that will protect the worker, the public, and the environment when the standards are implemented. In general, performance-based standards were chosen except where the standard was a law or rule or in the area of nuclear safety management. With respect to nuclear safety management, both implementing and management standards were chosen.

The approved set of standards and a detailed description of the process for selecting the set can be found in *Environmental Health and Safety Standards for Radioactive Waste Management Activities at Lawrence Livermore National Laboratory*,

February 1996 (UCRL-AR-122882). The contract between DOE and the University of California for the operation of LLNL will be modified to include these standards and the standards will be implemented.

Natural Bioremediation of Underground Fuel Contamination

LLNL led a team of researchers from LLNL and four University of California (UC) campuses in a collaborative study of underground contamination from leaking fuel tanks. The study, performed for the California State Water Resources Control Board (SWRCB), found that, once fuel leak sources have been removed, fuel contamination generally does not spread far from the leak site. Given time, naturally occurring microbes in the soil and ground water will usually break down most of the pollutants before they can reach a source of drinking water. On the basis of this study, the SWRCB is revising its overall ground water cleanup policy, ranking cleanup sites by their risk to drinking water sources and selecting appropriate cleanup techniques based on risk. As a result of the study, the SWRCB offered interim guidance in December 1995 to the State's Regional Water Quality Control Boards to halt pump-and-treat cleanup activities in cases exhibiting low risk to human health or the environment and instead institute monitoring programs to ensure contamination is stable. This risk-based bioremediation approach is expected to save the state and tank owners billions of dollars in cleanup costs and return thousands of acres of land to beneficial use sooner.

Cleanup Process for California's Leaking Underground Fuel Tanks (LUFTs)

As a follow-on to the foregoing item, LLNL is leading a team including UC Davis, UC Santa Barbara, UC Los Angeles, and UC Berkeley, to implement recommendations for a tiered risk-based decision-making approach for the cleanup of leaking underground fuel tanks (LUFTs). The work is performed under a contract with the State Water Resources Control Board (SWRCB). This new approach on LUFT cleanup includes the use of a modification of the American Society for Testing and Materials' Risk-Based Corrective Action (RBCA) decision making process, and the first priority use of natural attenuation for fuel hydrocarbons.

This new approach will be used to streamline and reduce costs for the investigation and cleanup of California's 21,000 leaking underground fuel tanks. This approach will consider the following parameters at each tank site: 1) natural attenuation processes; (2) existing and probable beneficial water uses; (3) source terms; and (4) plume stability. The LUFT team will oversee the demonstration of cost-effective technologies for measuring these parameters at nine U.S. Department of Defense (DoD) military bases in California. DoD LUFT pilot sites will be selected jointly with the SWRCB, and demonstration costs will be paid by the military. The potential cost savings from the implementation of this new approach in California are estimated to be $3 billion.

Cal/EPA Environmental Technology Certification Program

The California Environmental Protection Agency (Cal/EPA), through the Department of Toxic Substances Control (DTSC), has contracted with LLNL to provide performance evaluations for its hazardous waste environmental technology certification program. The program was created for two principal reasons: first, to simplify and expedite the permitting of new technologies for cleanup in California, and, second, to assist California environmental companies to sell their products and services. DTSC is looking toward LLNL as a source of scientific expertise in certain technical areas to (1) evaluate and verify a proponent's technology, and/or (2) to do peer reviews of evaluation reports. The LLNL site is also available as a test bed for private companies to test their technologies for certification.

DTSC reviews each vendor application to determine whether the technology is ready to be certified and estimates the cost of certification. DTSC collects the fee from the vendor, selects members and a chairperson for the teams, and organizes the evaluation and peer review efforts.

The first technology evaluated by LLNL was a field immunoassay system made by OHMICRON for polynuclear aromatic hydrocarbons (PAHs). The second technology is the Ray-O-Vac zinc-manganese rechargeable battery. Other evaluations are in progress.

Environmental Occurrences

Notification of environmental occurrences is required under a number of environmental laws, regulations, and the 5000-series of DOE Orders including DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, and DOE Order 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*. DOE Order 5000.3B, effective February 22, 1993, provided guidelines to contractor facilities regarding categorization and reporting of environmental occurrences to DOE. The order divides occurrences into three categories: emergencies, unusual occurrences, and off-normal occurrences. DOE Order 232.1, which will replace DOE Order 5000.3B, is pending acceptance by UC Regents. DOE Order 151.1, which will replace the 5500-series DOE Orders, is also pending UC Regents acceptance.

EPD responds to all reports of spills or other environmental occurrences through a well-established reporting process. EPD created a 7-day-a-week, 24-hour-a-day, on-call, rotational position called the Environmental Duty Officer (EDO), who can be reached by pager or by cellular phone at any time. Environmental analysts and the EDO cooperate in providing advice on immediate cleanup and monitoring necessary to protect the environment, in evaluating reporting requirements, and gaining concurrence from LLNL management on the process for notifying local, state, and federal regulatory agencies. The EPD response to environmental occurrences is part of the larger

LLNL On-Site Emergency Response Organization that also includes representatives from Hazards Control, Health Services, Plant Engineering, Public Affairs, Safeguards and Security, and Site 300.

EPD responded to 14 incidents that required agency notification during 1995. Two of the incidents were categorized as unusual occurrences according to the DOE Order 5000.3B implementing procedures. The other incidents were reported as off-normal occurrences. Of the two unusual occurrences, one began as an off-normal occurrence (July 12, 1995), but was later changed to an unusual occurrence (August 7, 1995). None of the incidents, summarized in **Table 2-5**, caused any adverse impact to human health or the environment. Agencies notified of the incidents described above included DOE, Alameda County Health Care Services Agency, San Joaquin County Public Health Services, San Francisco Bay Regional Water Quality Control Board (RWQCB), Central Valley RWQCB, National Response Center, Office of Emergency Services, and Department of Toxic Substances Control (DTSC).

Contributing Authors Acknowledgement

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Table 2-5. Tabulation of environmental occurrences, 1995.

Date[a]	Occurrence category	Description
Jan 18	Off-Normal	The Tank Assessments and Guidance Group (TAGG) received analytical data indicating that soil removed during the removal of underground diesel tank 271-D1U1 was contaminated with 340 mg/kg Total Petroleum Hydrocarbon-Diesel (TPH-D) at the Livermore site. The Alameda County Health Care Services Agency was notified of the release. A written report to outside agencies in a non-routine format meets the requirements for an Off-Normal Occurrence.
Jan 31	Off-Normal	Due to an oversight, the F006 waste code was not included in the LLNL Part A permit application at the Livermore site. The F006 waste code was added for both storage and treatment to the revised LLNL Part A and B permit application, which was submitted to DTSC. However, it was discovered on January 31, 1995 that an F006 waste had been brought to the Hazardous Waste Management (HWM) 612 Facility. As a result, HWM submitted a letter to DTSC notifying them of the incident. A written report to outside agencies in a non-routine format meets the requirements for an Off-Normal Occurrence.
Feb. 10	Unusual	The accidental discharge of a hazardous concentration of 1,2-dichloroethane (DCA) into the Site 300 Class II explosive wastewater surface impoundment was discovered and confirmed during the review of some old analytical reports from retention tank 827-R2A1, dated June 29, 1994. Subsequently the Central Valley RWQCB issued an NOV on April 20, 1995. To minimize the potential for future discharges of waste not compatible with the Site 300 Class II explosive waste-water surface impoundments, the Chemistry and Materials Science Directorate now requires that all wastewater be held pending the receipt and evaluation of analytical data from the samples of the influent waste stream. The National Response Center, Office of Emergency Services, San Joaquin County Public Health Services, Office of Emergency Services, and DTSC were notified. Any occurrence under any agreement or compliance area that requires notification to an outside regulatory agency within four hours or less meets the requirements for an Unusual Occurrence.
March 15	Off-Normal	Approximately 75,000 gallons[b] of potable water was released at Building 132 at the Livermore site when a contractor accidentally hit a fire hydrant causing the rupture of the water line. The main water supply system serving this area was immediately turned off. The quantity of water released violated a provision of LLNL's Waste Discharge Requirement 88-075, which requires notification to the San Francisco Bay RWQCB. A written report to outside agencies in a non-routine format meets the requirements for an Off-Normal Occurrence.
Mar 20	Off-Normal	LLNL personnel observed an oil sheen on water flowing into a storm drain at Site 300. It was determined that the oil sheen originated from the steam cleaning pad operation at Building 879 and that the water in the steam cleaning pad could have been blown over the top of the secondary containment berm by high winds occurring at the time of the release. The Central Valley RWQCB was notified because the sheen had an identifiable source, and it entered a surface water course. A written report to outside agencies in a non-routine format meets the requirements for an Off-Normal Occurrence.
May 5	Off-Normal	A hydraulic hose on a crane ruptured, releasing approximately 31 gallons of hydraulic oil. The Plant Engineering Riggers were operating the LLNL-owned crane on the west side of Building 436 at the Livermore site when the hose ruptured. The spill occurred on asphalt and was quickly contained by spreading Dry-Sorb on the spilled oil. The contaminated material was containerized in 55-gallon drums. A release of any oil greater than 10 gallons and less than 100 gallons meets the requirements for an Off-Normal Occurrence.
June 1	Off-Normal	Shipment papers for a drum of flammable liquid that was shipped to Romic Chemical had not been filled out properly. The drum was mistakenly labeled as a pyrophoric metal. The error was discovered by HWM personnel during a routine quality assurance review on June 1, 1995. Evidence of improper classification of hazardous materials transported offsite meets the requirements for an Off-Normal Occurrence.

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Table 2-5. Tabulation of environmental occurrences, 1995 (concluded).

Date[a]	Occurrence category	Description
June 19	Off-Normal	A 5-gallon carboy, identified as aqueous organics, pH 7, was sent to ENSCO on June 7, 1995. ENSCO's analytical indicated that the aqueous liquid had a pH 14. ENSCO sent a modified Hazardous Waste Manifest to DTSC, which described the discrepancy. Evidence of improper classification of hazardous materials transported off site meets the requirements for an Off-Normal Occurrence.
July 12	Off-Normal	Fourteen soil samples were collected by TAGG from beside Underground Storage Tanks (USTs) 419-R1U4 and 419-R1U5 at the Livermore site. This activity was part of the closure requirements to characterize the surrounding fill material before it was excavated. The samples were analyzed for gross alpha, beta, and tritium. Four samples showed gross alpha activity greater than non-detect, three samples showed tritium greater than non-detect, and two samples showed gross beta greater than non-detect. The Alameda County Health Care Services Agency was notified of the release. A written report to outside agencies in a non-routine format meets the requirements for an Off-Normal Occurrence.
Aug. 7	Unusual	(Upgrade of the July 12 occurrence from Off-Normal to Unusual.) A Notice of Violation was received from the Alameda County Health Care Services Agency by LLNL for failure to submit the Unauthorized Release Contamination Site Report for USTs 419-R1U4 and 419-R1U5, within the five-day period. The report was mailed within the five days, but was not received by Alameda County Health Care Services Agency. Any compliance activity for which a Notice of Violation has been received from the relevant regulatory agency that a site is considered to be in noncompliance meets the requirements for an Unusual Occurrence.
Sept. 20	Off-Normal	Five soil samples were collected by TAGG beneath UST 612-R1U2 secondary containment at the Livermore site as part of the requirements for closure in-place. All five soil samples, collected through a hole drilled in the bottom of the secondary containment, showed tritium above soil background levels of 5 pCi/gm. Sample analysis results ranged from 6.8 pCi/gm to 34 pCi/gm. The Alameda County Health Care Services Agency was notified of the release. A written report to outside agencies in a non-routine format meets the requirements for an Off-Normal Occurrence.
Oct. 25	Off-Normal	Approximately 80,000 gallons of swimming pool water was discharged to ground due to a leak in the swimming pool at the Livermore site. The residual chorine was measured to be between 2 and 3 parts per million. The leak was repaired on September 26, 1995. The San Francisco Bay RWQCB was notified of the release. A written report to outside agencies in a non-routine format meets the requirements for an Off-Normal Occurrence.
Nov. 1	Off-Normal	800 gallons of bulked waste was shipped as California-only regulated waste. The waste was determined to be F-Listed when tested by the off- site treatment facility. The tank and its contents were shipped back to LLNL. It was determined that 55 gallons of F-Listed waste had been bulked with the California-only regulated waste. Evidence of improper classification of hazardous materials transported offsite meets the requirements for an Off-Normal Occurrence.
Nov. 22	Off-Normal	A street sweeper released hydraulic oil throughout the southeast corner of the Livermore site. It was determined that approximately 18 gallons of hydraulic oil was released through a leak in the hydraulic line on the street sweeper. A release of any oil greater than 10 gallons and less than 100 gallons meets the requirements for an Off-Normal Occurrence.

a The date indicated is the date the occurrence is categorized, not the date of its discovery.

b 1 gallon = 3.785 liters. English units are used in this table for consistency with information in the original documentation.